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approach

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TECHNOLOGY & SCIENCE

UPERVISION

As a Contributing Cause Factor in Aircraft Accidents

SUPERVISION, or lack of it, was a *primary* cause factor in 27 major aircraft accidents during FY 70. Since this represents only about six percent of all major accidents, it may appear that supervision is, or was, a relatively minor factor in the overall picture. However, when you consider that supervision was cited as either a primary or *contributing* factor a total of 130 times in major aircraft accidents and 893 times in minor aircraft accidents and incidents in FY 70, the perspective is somewhat different.

Before further elaboration, let's define "primary" and "contributing" cause factors. A primary cause factor is assigned to every aircraft accident except where one cannot be determined. The primary cause factor is, by definition, the *principal* established cause of an accident. In an accident where there are multiple cause factors, it is the first cause factor in the order of importance. All other cause factors are then labeled "contributing cause factors."

A contributing cause factor is defined as any event, condition or circumstance, the presence or absence of which *increased the probability* of a given mishap.

Often we are prone to consider only the primary cause factor in an aircraft accident but the contributing causes are also important. Consider, for example, the case of an F-4B pilot on an extended cross-country flight. He had already flown two daylight legs and at the time of the accident was completing the third leg of the flight in night IFR conditions. The weather at destination was marginal and the pilot was diverted to another field. Because of minimum fuel state, he was being given radar vectors for a VFR straight-in approach. Witnesses heard a rough power application on final and noticed that the aircraft was high approaching the runway, at which time a high sink rate was established. This resulted in a hard night field landing, causing the starboard main landing gear to collapse and the aircraft to overturn.

The pilot was clearly the primary cause factor in this accident but when all the circumstances are considered, it is equally clear that he was not the only cause factor. Specifically, it was later determined that this was the pilot's *first night field* landing in almost a year. Lack of supervision was therefore assigned as a contributing cause factor. This illustrates rather well that all contributing cause factors must receive due consideration, along with the primary cause factors, if we are to be effective in the prevention of accidents.

A wide range of supervisory factors contributed to major aircraft accidents in FY 70. In several cases the pilots involved were inadequately trained or qualified for the flights which they undertook. In some cases it was due to an inadequate squadron training program and in other cases it was due to an individual's failure to properly assimilate the training provided. Regardless, the scheduling of an improperly prepared pilot must be considered a supervisory factor.

Closely related to inadequate training are the problems of inadequate briefs, lax scheduling procedures and inadequate procedures for the qualification and designation of flight leaders which were indicated in some reports. In particular, the inadequate qualification/designation of flight leaders was listed as a contributing factor in a substantial number of FY 70 accidents.

Lack of cockpit coordination was also a factor in a number of accidents in multi-piloted aircraft. This problem usually arose because the pilot in command failed to make clear before takeoff the status, responsibility and authority of each pilot and crewmember involved.

Lack of command guidance figured in several accidents. NATOPS procedures, for example, were inadequate for some aircraft in several well-defined areas such as jettisoning of external stores and throttle linkage failure. In other cases, supervisory personnel on the ship failed to provide adequate guidance or control in actual or

potential divert situations during CV ops. In two cases, multi-engine aircraft received substantial damage during wingfold or spread cycles which were conducted on a carrier deck under improper circumstances but with the knowledge of the air officer.

Supervision in the area of aircraft maintenance was a substantial factor in FY 70 accidents. In several cases, excessive delay in providing or incorporating aircraft service changes was cited as a contributing factor. At the other end of the maintenance supervisory spectrum, inadequate quality assurance inspections were cited as contributing factors in a number of accidents. In between, maintenance supervision was cited as a factor in mishaps when maintenance personnel failed to perform proper preflight, allowing aircraft to continue normal operations with known discrepancies and/or inoperative equipment, and failed to correct repeated discrepancies.

Some specific examples of how supervisory factors contributed to FY 70 aircraft accidents are briefed below:

- Two TA-4Bs were scheduled for a section tactics and practice GCA flight. The flight leader and wingman decided to fly the first portion at low level and then return for GCA approaches. The wingman, acting as chase pilot, flew 1000 feet abeam, stepped up 1000 feet. The flight departed on the low level route as briefed with the lead descending to 600 feet AGL in a turn. The chase pilot followed the turn on the outside. During subsequent maneuvering to close the gap and maintain visual contact, he descended to 70 feet AGL, striking some power lines. He immediately joined on the lead and returned to base for a precautionary landing. The aircraft suffered extensive nose, wing and fuselage damage. Investigation revealed that the flight was inadequately planned due to the use of improper charts and a lack of time/distance, minimum altitudes, courses and fuel checks. The flight leader did not determine the flight capability of the chase pilot. The airbase VA manager did not give the pilot a complete checkout or assess the need for supervised flights after the pilot checked into the squadron. Lack of recent A-4 experience was also assigned as a factor.

• A C-1A aircraft, after a night catapult launch, was observed to level off, then enter a gradual descending turn impacting the water at a speed of 130-135 knots. Weather conditions were clear, the night was dark and visibility was four miles in haze with no discernible horizon. The copilot (plane commander) was rescued but the pilot was not recovered. It was the pilot's first night catapult shot and after the catapult fired, he popped the nose down to level flight in a sudden and abrupt motion. The pilot, with both hands on the yoke, appeared to "lock on the controls" and to be flying the aircraft by reference to the gyro horizon exclusively. The copilot gently attempted to pull back on the yoke but the pilot resisted this pressure. Low altitude made a timely response critical and only quick, positive action by the copilot could have prevented the mishap. Both pilots had had a long, tiring day of flight operations and it is suspected that fatigue accentuated the disorientation or fixation of the pilot and the slow reaction of the copilot. Investigation revealed that the radar altimeter was inoperative but that both pilots were aware of this fact before takeoff. Maintenance supervision was cited as a factor in the assignment of an aircraft with an inoperative radar altimeter for carquals on a dark night with no horizon, as was the plane commander's acceptance of the aircraft. It was also determined that the end speed on the catapult launch exceeded the maximum allowed for one-third flaps by 12 knots. This would have caused the pilot to use both hands on the yoke to maintain level flight. Therefore, inadequate knowledge of catapult bulletins by the catapult officer was also listed as a contributing factor.

• A T-28 aircraft was observed making an inverted roll entry to a target from an altitude of about 1000 feet. The subsequent pullout was not completed before the aircraft impacted the ground. The T-28 was part of a two-plane scheduled close air support demonstration flight. The pilot in the front seat, apparently in control, was on the flight schedule as plane commander. He was not currently qualified in the aircraft in type mission to be performed, although he did have previous T-28 experience. The pilot in the rear seat had equal experience and was current in the aircraft; however, he had not qualified in the rear seat as required by squadron policy. The pilot of the lead aircraft, on a prior run, had executed a victory roll on climbout. This may have influenced this pilot to perform an acrobatic type entry. His technique was improper and due to the cloud layer at about 1200 feet, insufficient altitude was available for pullout. The primary cause of the accident was pilot technique and judgment in executing an acrobatic maneuver with insufficient altitude for recovery. A contributing factor was inadequate supervision of the flight schedule by squadron operations in that the pilots assigned to this flight were not properly qualified.

The effect of a primary cause factor in an aircraft accident is easily understood but it is difficult to assign exact importance to contributing cause factors. This is particularly true in the case of supervision where human factors are involved. However, it is well-known that many accidents are the end result in a long chain of circumstances. If so much as one link in the chain can be broken, an accident will be less likely. Moreover, a contributing cause factor, by definition, *increases the probability* of an accident. Therefore, it is reasonable to believe that naval aviation safety will benefit over the long run if contributing cause factors, especially supervisory factors, can be minimized or eliminated. Basically, it is a matter of *improving the odds* for safe flight by giving close attention to all aspects of maintenance and operations, thereby insuring that aircrews are provided with the best possible guidance, training, equipment and operating conditions on every flight.

Short Snorts

"Good judgment comes from experience,
and experience comes from poor judgment."

Ace L.

Don't Rush

ENROUTE from NAS Southeast to Midwest AFB, an F-4 suffered a utility hydraulic failure and the pilot decided to divert to NAS Halfway. He requested the Center and NAS Halfway approach control to notify the tower that he wanted an LSO on station and an arrested landing.

Upon arrival at NAS Halfway, he was cleared to land by the tower. He landed, anticipating a short-field arrestment. After he passed by the short-field arresting gear location (the gear was not rigged) he started manual braking action but did not deploy the drag chute. Both main gear tires blew and the pilot secured the engines. The aircraft departed the runway and traveled 1500 feet before coming to rest. The damage to the aircraft was limited.

The primary cause of this mishap was the failure of the utility hydraulic system, however, the pilot was considered to be a contributing factor. The pilot had requested an LSO and an arrested landing, assuming the short-field arresting gear would be rigged. Facility personnel, however, assumed he desired to use the abort gear which was already rigged. The pilot was not specific in his request concerning the type of arrested landing desired. The LSO was on station but not yet on the radio. The pilot unduly rushed the landing by not waiting for the LSO to come up on the radio.

The commanding officer made the following comments on this mishap:

"The importance of making proper preparations for handling aircraft malfunctions has been reemphasized to all pilots and crewmen of this command. All too often complacency in the treatment of even minor malfunctions results in tragic consequences. This malfunction, fortunately, resulted in only limited damage to the aircraft.

"The pilot involved is well qualified and experienced in the F-4. He has previously experienced utility hydraulic system failures while deployed which ended in routine landings aboard ship. When the utility hydraulic system failed on this flight he was not overly concerned. He diverted to a relatively unfamiliar field where tower personnel control only a limited number of F-4 aircraft. Since time was not a factor it is probable that the aircraft could have been safely landed if the pilot had:

- Specifically requested and received acknowledgement for a short-field arrested landing with the assistance of an LSO.
- Verified that preparations for the short-field arrestment were complete.
- Conducted a radio check with the LSO.
- Familiarized himself with the location, availability and status of all arresting gear on the runway.
- Had alternative plans of action in mind in the event the short-field arrestment failed, i.e., wave off and try again, land and use manual braking with drag chute deployed or use abort gear."

Missing Bushing

A TA-3B was on the first leg of a TransLant flight. The landing and rollout at the first stop enroute appeared to be normal. After rollout, a 180-degree turn was made on the duty runway to taxi back to the ramp area. During the turn, a slight vibration was noticed. Nosewheel shimmy or directional control difficulty was not experienced and taxi was continued to the line area. Examination of the nose section after shutdown indicated the nosewheel to be off center and rubbing against the strut fork. Further inspection revealed the nose gear shock strut axle cone bushing was missing.

The nosewheel had been changed on the day prior to the flight. The strut bushing had inadvertently been omitted when the tire was changed. Without this

bushing, the nose tire can have approximately three inches of side play. With this much movement the nosewheel bearings could fall out, allowing further damage and possibly the loss of the entire nosewheel.

The commanding officer noted that this was "a clear case of installation error, combined with an unsatisfactory follow-up by quality assurance. Only quality maintenance can preclude future incidents of this nature. Each man must check each job he performs. The maintenance man that changed the tire was not entirely familiar with the A-3 since he had been predominantly associated with A-5 maintenance. The A-5 does not have a bushing similar to the TA-3B. Moreover, location of this bushing is such that it would not normally be noticed on a preflight."

A-7E Brakes

AN A-7E was alert loaded and being respotted from the vicinity of catapult No. 1 to amidships. An A-6C was spotted fore and aft between catapults No. 1 and 2. The flight deck crew attempted to use a tractor to move the A-7E but the proximity of the flight deck edge and another A-7E made this impossible. The tractor was therefore removed so the aircraft could be manually moved to a position where the tractor could be attached. The plane captain was riding the brakes which he had pumped to 1400 psi on the gage. He had also performed a daily inspection, discharging all hydraulic accumulators.

The ship was in about a three-degree port list when movement of the aircraft was started. As it was pushed aft it began to move too rapidly and the director whistled for brakes. The plane captain applied the brakes and, getting no response, pulled the emergency brake handle, which also failed to produce any braking action. Chocks were thrown under both wheels but the starboard wheel jumped the chock, the nose tow bar swung 180 degrees clockwise and the aircraft rolled backwards into the A-6C. Contact was made between the A-7's port aileron and the A-6's starboard flap. Both received limited damage.

The causes of this ground accident were:

- Too many applications of the brakes by the plane captain prior to having them pumped up again.
- Performance of a daily inspection prior to the final spotting of the aircraft. This procedure eliminated the emergency brakes.

The commanding officer's comments and recommendations included the following:

"During the daily inspection of the A-7E both the utility brake accumulator and the emergency brake accumulator are dumped. In this status the aircraft has no brakes until the accumulators are recharged. The utility system can be partially recharged by a manually operated pump in the left wheelwell. In this incident, although the utility pressure was pumped to 1400 psi, it obviously was not adequate for safe movement of the aircraft.

"The limitations of the system have been reemphasized and all plane captains and line personnel have been instructed not to perform the accumulator checks until after the aircraft is securely tied down and in its final deck spot. In the event that an unforseen reason necessitates movement of the aircraft while the accumulators are empty the utility system will be pumped to a minimum of 1500 psi but the aircraft is to be handled as if it had no brakes."

Well, I'll Be . . .

A CRANE operator had just lifted the transmission and rotor head of an SH-3 and backed away. As he began to lower the angle of the boom, the rear wheels of the crane rose and the load was dumped heavily to the concrete. The envelope of the crane (weight versus distance from the CG) had been exceeded. ◄

Ready To Tow

ONE morning, after quarters, a crewman was sent to the flight line to remove tie-downs and prepare a CH-53 to be towed into the hangar for maintenance work. He did part of his job but failed to release a line from one main rotor blade which was secured *to a pad eye.* Two hours later a supervisor and four assistants (undergoing training) proceeded to the helicopter to begin towing. The tractor was attached and after a cursory look the driver began towing. As he began moving the operator felt a tug but continued towing because he thought the brake rider might have tapped the brakes. After about five feet more travel the driver felt resistance again. This time he stopped and was *real shook* when he saw an extensively damaged main rotor blade. There were no wingwalkers!

AUTHORITY oft

A FLIGHT of two F-8Ks was scheduled for an instrument round-robin flight which was to be an annual instrument check for one of the pilots. Both pilots were very experienced, with substantial time in model as well as total flight time. The junior pilot was the one *receiving* the instrument check.

The flight was briefed to depart NAS Homebase, fly a route to Distant AFB, via radar vector International vortac, Jet Route Southern City, direct Distant AFB Initial Approach Fix. After an approach to Distant AFB and a missed approach the flight planned to get clearance to NAS Homebase as an alternate.

Each pilot signed his own yellow sheet. The junior pilot noted that on the last previous flight of his aircraft, the attitude gyro had "tumbled" during ACM but had partially erected itself by the time the aircraft had returned to the line. This was discussed between the pilots and it was agreed that if the gyro checked good after takeoff, they would proceed with the flight.

The pilots then proceeded to the operations building for a weather briefing and to file the flight plan. The senior pilot remained in the flight planning room while the junior pilot took the flight plan to the weather office. However, the senior pilot did come into the weather office just as the weather briefing was being concluded. No unusual weather was mentioned by the forecaster. In fact, he made a general comment to the effect that there was very good weather expected.

After preflight, start and poststart checks were completed, the pilots received their IFR clearance, were cleared to switch to departure control and cleared for takeoff. Once airborne, the Center was unable to receive an IFF "Ident" from the junior pilot (hereafter referred to as F-8 No. 1); however, they were able to receive a response from the senior pilot (F-8 No. 2). Therefore, the flight was continued.

The flight entered the APC (area of positive control) nine minutes after takeoff, cleared to FL 350. F-8 No. 2

ofthe Pilot

(the check pilot) was flying a loose instrument chase position.

Fourteen minutes after takeoff, the flight reported reaching FL 350. Eleven minutes later the flight was cleared to FL 370 and was advised that they could have FL 350 back in about 30 miles. Two minutes later, the flight reported level at FL 370. About this time, the pilots began to give attention to an area of thunderstorms along the flight route and began to consider efforts to avoid it. (Note: It was later determined that this thunderstorm area was 30 to 40 miles wide with tops at FL 470.)

About one minute after reaching FL 370, F-8 No. 1 requested a deviation to the south of course. The Center did not respond. About 30 seconds later, F-8 No. 1 again called the Center but still received no response. This call was repeated 15 seconds later with the same result. (It was later determined that the controller was experiencing a communications overload and some of F-8 No. 1's transmissions were blocked out by transmissions of other aircraft.) After another 30 seconds, F-8 No. 1 again requested a deviation to the south of course. This time the Center advised F-8 No. 1 they would have to continue on course for another 15 miles before a deviation to the south could be approved. F-8 No. 1 responded, "That's going to put us right in it." After requesting an "Ident," the Center advised they could approve a higher altitude. F-8 No. 1 responded that he didn't want a higher altitude and advised the Center, "You're driving me right into where I don't want to go." Center then advised F-8 No. 1 that he could make a right turn to the northeast, but F-8 No. 1 replied, "Negative, we'll try to go on through here." (Note: A northeast turn would not have provided weather clearance.) The time was three minutes and 40 seconds after the flight first reached FL 370.

Forty seconds earlier, F-8 No. 2 had called F-8 No. 1 and advised him to remain VFR and descend out of APC but F-8 No. 1 apparently did not receive this transmission as there was no answer. The flight entered the thunderstorm approximately one minute later.

F-8 No. 2 was closing on F-8 No. 1 as the aircraft entered the clouds. At first, F-8 No. 2 could still see F-8 No. 1 but upon entering much thicker clouds, he lost sight of the other aircraft. He immediately turned left 20 degrees for separation to prevent overrunning F-8 No. 1. Shortly after turning left, F-8 No. 2 flew out of the heavy weather into much thinner and less turbulent clouds. He then parallelled the base course and broke out into the clear shortly thereafter.

About one to two minutes after the flight entered the clouds, Center requested F-8 No. 1 to switch to an adjacent Center on a different frequency. F-8 No. 1 advised that the Center had "run me right into a bumper, I can't switch." Center advised him to switch when he could. About one minute later, F-8 No. 1 began a radio transmission which was broken off right after the identification was given. That was the last recorded transmission from F-8 No. 1. Investigation disclosed that the aircraft impacted the ground about five minutes later. The pilot was fatally injured. F-8 No. 2 subsequently descended out of APC and made a safe landing.

The possibility of material failure/malfunction was considered by the aircraft accident board. In particular, the board considered the possibility that the VGI had failed inasmuch as it had malfunctioned on a previous flight. However, since both pilots had discussed this possibility prior to takeoff, and did not report it in error prior to penetration of the thunderstorm, the board concluded a malfunction was unlikely. Nevertheless, an endorser to the AAR stated: "There is a possibility that the attitude gyro failed, partially or completely. The

potential for this was present as indicated by the discrepancy reported on the previous yellow sheet. Also, the forces present in any thunderstorm are sufficient to cause partial or complete failure of a weak instrument such as this."

The UHT (unit hydraulic tail) was found to be trimmed to an abnormally high aircraft nose-up position; however, after thorough investigation, it was concluded that there had been no UHT trim failure. Engine failure was also rejected as a cause factor.

The leading edge center section outboard droop cylinders were recovered, measured and X-rayed. Measurement of the forward extension rod indicated land droop extension. X-ray photography revealed the forward locking fingers were not broken, indicating that the leading edge droops were actuated to the land droop position prior to impact. The wing incidence actuator was located and was determined to be in the wing down and locked position.

The weather encountered by the pilots was considerably different from that given in the forecast. The actual frontal weather that developed during the flight was being reported about the time pilots received their weather brief, however, the weather was not posted in the weather office for the forecaster's use. An endorser to the AAR stated: "The weather briefing received by the pilot was in error. There can be no excuse for the fact that later information was available to the weather office than was used for the briefing."

The pilot's actions between the time of his last transmission and the time of impact (about 5 minutes elapsed time) is mostly unknown. He made no radio calls and was in the clouds. The fact that he made no radio calls could have been due to temporary unconsciousness but the board noted that even if he were conscious and attempting to control the aircraft, it is unlikely that he would have made any attempt to transmit his difficulties.

The board conjectured that the aircraft at some point entered a stall, possibly as the result of the pilot having unintentionally induced an abnormal amount of nose-up trim. The aircraft then went into a spin, apparently at an altitude high enough to enable the pilot to apply spin recovery procedures, i.e. idle engine and emergency actuation of the land droops.

The board concluded that the cause of this accident was loss of control of the aircraft, resulting from either simple disorientation or pilot incapacitation.

It was evident from radio transmissions that the pilot did not want to penetrate this thunderstorm but apparently felt compelled to do so. *He was in error in that he assumed an ATC clearance or lack of it was entirely mandatory; it is not. The ultimate responsibility for the aircraft and flight rests with the pilot. He failed to realize this responsibility fully and did not use his prerogative to exercise emergency authority in taking whatever actions were necessary in the interests of safety of flight.* Other factors which may have influenced him in his decision to penetrate the thunderstorm were that he had successfully penetrated thunderstorms and towering cumulus on previous flights – and this was his annual instrument check.

The investigation revealed that high altitude air traffic was very heavy in the general area where the accident took place. The situation was complicated by the fact that controllers were having to manually handle and coordinate numerous requests (which overloaded voice circuits) for deviation around severe weather in the area.

Loss of control of the aircraft and the reasons for it are conjecture. What occurred inside the thunderstorm cannot be known but there were at least two factors leading to the ultimate disaster, either of which, if corrected, would have eliminated the accident potential. There might have been no accident if the weather briefing had been accurate and the flight had been planned to avoid severe weather. There might have been no accident if ARTCC had been able to approve a deviation. *However, in either case, correct pilot judgment would have overcome these contributors.* Paragraph 91.3 of FAR Part 91 entitled, Responsibility and Authority of the Pilot in Command, states:

- The pilot in command of an aircraft is directly responsible for, and is final authority as to the operation of the aircraft.
- In an emergency requiring immediate action, the pilot in command may deviate from any rule of this SubPart B to the extent required to meet the emergency.
- Each pilot in command who deviates from a rule under paragraph (b) of this section shall upon the request of the Administrator send a written report of that deviation to the Administrator.

Point being that the man in the cockpit is ultimately responsible for his own safety. He has the authority to take whatever reasonable action he feels necessary, and the decision as to what constitutes an emergency is up to him. A note explaining why some particular action was taken is a small enough price to pay.

Don't let circumstances, coincidences, or reluctance to act get you into the binds! ◄

A cat has nine lives – A pedestrian only one.

Safety Review

CIRCLING APPROACH

A note in the IFR Supplement states, "The circling MDA and weather minima to be used are those for the runway to which the final approach is flown – not the landing runway." The reason you use the minimums for the runway to which the final approach is flown is to assure that required obstacle clearance is provided in both the final approach and circling approach areas. Despite this note, there is still confusion on this point, and some pilots are still using minimums for the runway to which they are circling.

Weekly Summary (reprinted from Aerospace Safety)

3rd MAW El Toro, California – "The item published on page three of the 20-26 September 1970 WEEKLY SUMMARY (see above) entitled Circling Approach *caused me to study further the intent of the rule involved.*

It appears that there is reason for confusion and in some cases those pilots still using the minimums for the runway to which they are circling *may be correct as far as the spirit of the law is concerned! To illustrate my point, take the case used as an example in the Note mentioned above (IFR Supplement, page 11, Note 2 under Landing Minima) only reverse the situation: A category C aircraft flying a radar approach to runway 28, circling to land on runway 10. Should he use an MDA of 620 feet with weather minima of 500/1½? If he did he would not be assured that required obstacle clearance is provided in both the final approach and circling approach areas for he would be 200 feet below the required ceiling and 60 feet below the required MDA for the circling approach."*

Continued

GENERAL

The United States Standard for Terminal Instrument Procedures (TERPs) is the approved criteria for formulating instrument approach procedures.

All instrument approach procedures are being revised to comply with the TERPs criteria. When revised, several changes in the depiction of landing minima are necessary.

The following changes are the most significant and must be thoroughly understood for proper use.

LANDING MINIMA

Landing minima are established for five aircraft approach categories (A, B, C, D and E). Categories of U.S. military aircraft are published in Section I FLIP Planning. Where instrument approach procedures are published in accordance with TERPs criteria, the standard format for portrayal of landing minima is as follows:

ASR	RWY	CATEGORY	MDA	RVR	HAT	CEIL–VIS
	28	A, B, C, D, E	440/	40	278	(300–¾)
	10	A, B, C, D, E	540/	40	378	(400–¾)
PAR	RWY	CATEGORY	DH	RVR	HAT	CEIL–VIS
	28	A, B, C, D, E	262/	16	100	(100–¼) GS 2.5°
	10	A, B, C, D, E	262/	24	100	(100–½) GS 3.0°
CIRCLING	RWY	CATEGORY	MDA	VIS	HAA	CEIL–VIS
	28, 10	A	540–	1	370	(400–1)
	28, 10	B	620–	1	450	(500–1)
	28	C	620–	1½	450	(500–1½)
	10	C	(1) 680–	1½	510	(600–1½)
	28, 10	D, E	720–	2	550	(600–2)

NOTE:
1. Minima shown are the lowest permitted by established criteria. Pilots should consult applicable directives of their respective services for aircraft model/command restrictions.
2. The circling MDA and weather minima to be used are those for the runway to which the final approach is flown – not the landing runway. In the above example, a category C aircraft flying a radar approach to runway 10, circling to land on runway 28, must use an MDA of 680 feet (1) with weather minima of 600–1½.

10

Fig. 1

(Note: In order for everyone to follow along refer to Fig. 1 from the IFR Supplement. First of all let's set the stage. Terrain clearance/obstacle clearance is established for each approach independent of other approaches. However a minimum of 300 feet above the highest obstacle in the immediate area of the airport is as low as the law allows. Referring to Fig. 1 it is easy to see that the MDA, for a category C aircraft shooting an approach to runway 28 circling to land on runway 10, is 620 feet and the ceiling/visibility must be at least 500/1½. Since there is no approach plate to refer to, an assumption must be made that there are no airport obstructions or caution areas. Therefore we can assume that the pilot will break out at minimums or above and being VFR can circle and land on runway 10 by maintaining 620 or lower (whatever it takes to stay contact). He is positively assured that the MDA of 620 will clear anything in the airport zone by at least 300 feet – and probably more. The mere fact that his MDA for runway 28 is below the MDA for runway 10 doesn't change the safety aspects *around the airport*. Of course if the pilot is not able to keep the runway environment in sight during his circuit he must execute an immediate waveoff and carry out missed approach procedures. – Ed.)

"A more vivid example of where this could get a pilot into trouble is if he was flying a category A aircraft on a final approach to runway 26, circling to land on runway 32 at Buckley ANGB, Colorado. According to my interpretation of the Note in the IFR Supplement he would use an MDA of 6060 with weather minima of 400/1. The resulting HAA of 397 would be 220 feet below that required for the circling portion. I believe confusion would be eliminated and the intent of the rule served if it were reworded as follows: The circling MDA and weather minima to be used are those for the runway to which the final approach is flown but not less than the circling MDA and weather minima of the landing runway. This would assure the required obstacle clearance for both the final approach and circling approach areas."

MAJ L. M. Collins
Safety NATOPS
Marine Helicopter
Training Group 30

Whoa! The only result of your suggestion would be to raise the minimums for many approaches to airports and effectively deny their use under many situations where

◆BUCKLEY ANGB, COLO. (Denver) 39°42′N 104°45′W GMT–7 (–6DT) **H–1, L–6–8**
ANG (AF) (NG) (N) (MC) (NARF) 5663 BL 6, 7, 8 H110 (ASP) (S100, T140, TT280) (SWL 45) **(BKF)**

JASU- 8(A–7), 3(MD–3), 8(MA–1), 1(MC–1 MOD), 3(MC–2A)

FUEL- A+J4, SP, O–128–133–148–156 PRESAIR LHOX LOX

J–BAR/A–GEAR

RWY 08	MA-1A MODIFIED (144' OVRN)	———		MA-1A MODIFIED (196' OVRN)	RWY 26
RWY 14	MA-1A MODIFIED (110' OVRN)	BAK-12(B) (40' OVRN)	BAK-12(B) (40' OVRN)	MA-1A MODIFIED (110' OVRN)	RWY 32

AERODROME REMARKS- PPR all cargo trans acft. CAUTION–hvy commercial tfc at Stapleton Intl Aprt 5 NM NW of Buckley. Tran alert svc aval 24 hr. Right hand ptn rwy 14. 360° overhead ptn rwy 14 not auth for tran acft. See USAF Academy Special Notice FLIP Planning Sec II. Special VFR clearances proh.

COMMUNICATIONS-(SFA) (PTD 372.2) (TIE-IN FSS DENVER)

Ⓡ **DENVER APP CON**- 363.0 ⓐ 269.3 ⓑ 390.8 351.8 284.0 271.3 257.8 120.5 ⓑ 119.3 ⓐ 124.8 116.3T **(E)**

TOWER- 289.6 236.6 121.0 126.2 11[illegible].7T **(E) GND CON**- 275.8

DENVER DEP CON- 351.8 381.5 126.9 124.8

VFR ADVISORY SVC- Ctc Denver APP CON 20 NM out on 269.3

RADIO AIDS TO NAVIGATION

(T) VOR BKF 112.7 39°42′09″N 104°45′24″W At Field

(L) TACAN BKF Chan 33 39°42′27″N 104°45′06″W At Field

RADAR ⓒ - 284.0 269.3 271.3 134.1 142.02 **(E)**

	RWY	CATEGORY	MDA RVR	HAA	CEIL–VIS
ASR	26	A, B, C, D, E	6060–1	397	(400–1)
	32	A, B, C, D, E	6280–1	617	(700–1)

	RWY	CATEGORY	DH RVR	HAT	CEIL–VIS
PAR	32	A, B, C, D, E	5863–½	200	(200–½) GS 2.5°
	26	A, B, C, D, E	5888–¾	300	(300–¾) GS 2.5°

	RWY	CATEGORY	MDA VIS	HAA	CEIL–VIS
CIRCLING	26	A	6060–1	397	(400–1)
	26	B	6120–1	457	(500–1)
	26	C	6120–1½	457	(500–1½)
	26	D	6220–2	557	(600–2)
	32	A, B	6280–1	617	(700–1)
	32	C	6280–1½	617	(700–1½)
	32	D	6280–2	617	(700–2)
	26–32	E	6380–2	717	(800–2)

RADIO/NAV REMARKS- No-NOTAM preventive maint hrs: TACAN - Mon 1600–2000Z, VOR - Tue 1600–2000Z. ⓐ 270°–089°. ⓑ 090°–269°. ⓒ Opr 1600–0400Z Tue thru Sat; OT 5 min ntc rqrd.

Fig. 2

11

reported weather would permit safe approaches under present criteria. Here's why. Again we'll set up Fig. 2 and Fig. 3 to see what's what. Your interpretation of the minimums for a category A aircraft on approach to 26, circling to land on 32 is correct. The MDA is 6060 feet and reported meteorological conditions must be 400/1 or better. Since Buckley's elevation is 5663 feet that means the aircraft must be contact on reaching 6063 or higher to continue the circling portion to land on 32. Now note that the highest obstruction listed on the approach plate within the 10nm arc is only 86 feet above the airport elevation. Therefore the pilot has at least 300 feet (actually 311 feet) above the closest obstacle. Assuming also that he is contact at the authorized minimum of 6060 he can circle to 32 and land knowing he'll clear everything around the airport safely. Now the MDA of 6280 for an approach to 32 initially must be higher because of terrain or obstructions on the

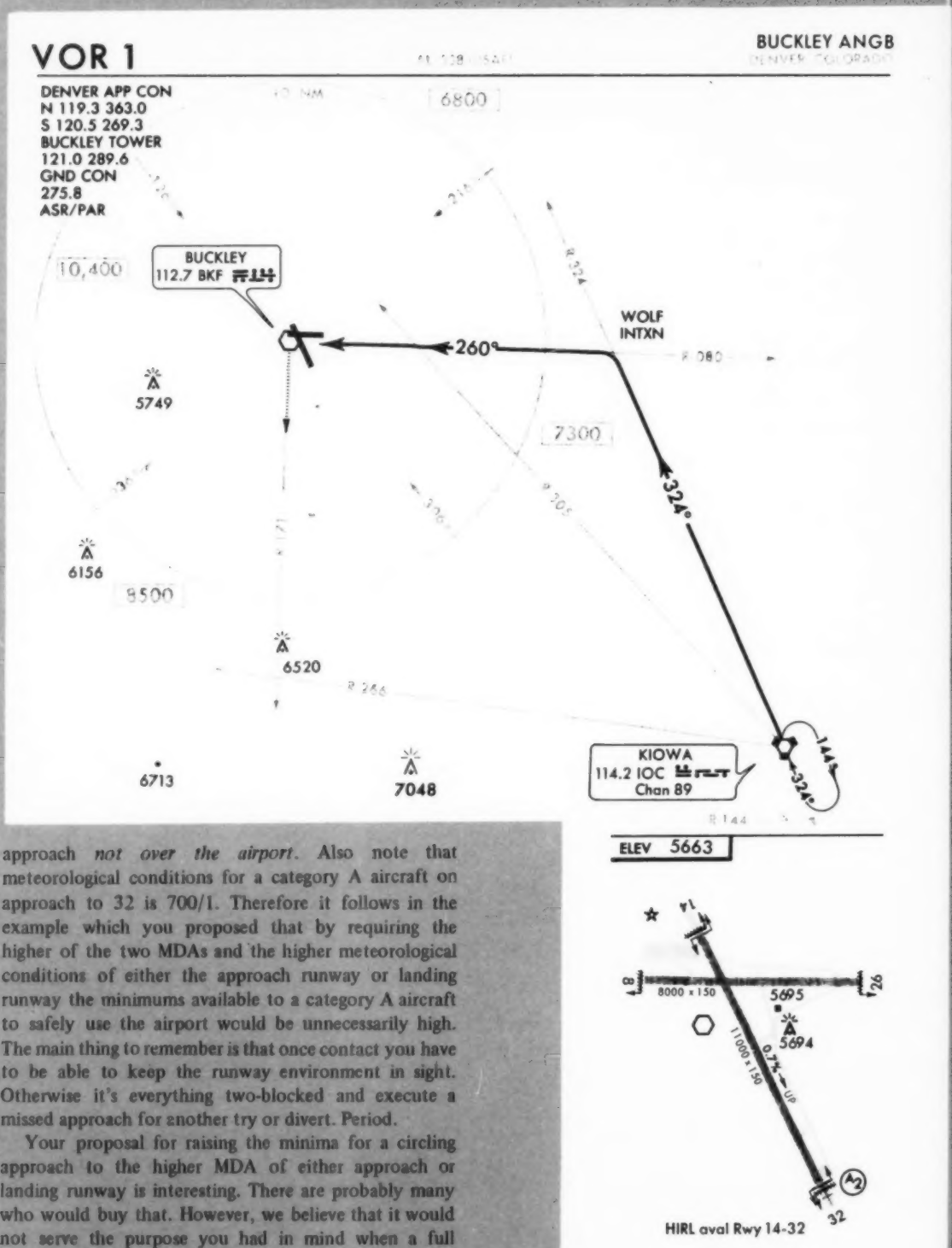


Fig. 3

approach *not over the airport*. Also note that meteorological conditions for a category A aircraft on approach to 32 is 700/1. Therefore it follows in the example which you proposed that by requiring the higher of the two MDAs and the higher meteorological conditions of either the approach runway or landing runway the minimums available to a category A aircraft to safely use the airport would be unnecessarily high. The main thing to remember is that once contact you have to be able to keep the runway environment in sight. Otherwise it's everything two-blocked and execute a missed approach for another try or divert. Period.

Your proposal for raising the minima for a circling approach to the higher MDA of either approach or landing runway is interesting. There are probably many who would buy that. However, we believe that it would not serve the purpose you had in mind when a full understanding of the amount of protection in existence is known.

V
C
L

WE GET LETTERS

commander w j isenhour
editor
Reproach magagine
Norfork virginy

Hello Ike,

A bunch of us fortunates of war was sittin arond last nite at the snake pit sharin a gud botle of booze talkin about safety of flite. one of teh guys says he knowed you way back when you was a real livver with them paddles in yor hand on the – end of a boat.

We thot you mite like to know we got a rite expert buncha guys in this outfit an maybe we could pass on sum tips of the trade. we get your munthly perduction an really enjoyed that caleb flerk yarn but zeke zlinski in our gang kinda got hot on the collar cuz hes a cuzin of the flerks an thot you was pokin fun at the famly. we tole him you always change names to keep the guilty – uncogito aint that rite?

Well to get down to brass tax so to speek we got willy washout who was instruktin in yeller perrils at bronsun. Every week we gotta lissen to him ½ day cover airynauticle stuff. Last week for instunce he saved my . talkin about crosswind landins and i hadda make one almost ded stick when my motor got real sik. it didunt quit but it was belchin smoke so i eased into a field outa the wind keepin the wing down til most on the ground. then we got porky puttin, his reel name is pete, who jumped the furst rusky in coria flyin f86 cats. hes our tatiks and stragedy guy an we gotta lissen to him ever flite when it looks lik we mite git in a tangle. just the other day he kep one of our guys alive by telling him to drop – the drop tanks befor fitin. course he didunt keep him from gettin shot up but he dropped the tanks befor bailin out. wurked pretty good to. we got all kinds of guys lik these guys but aint none of em touch the candel to our boss. You know that wain guy in movement pitchers hes a patsy compare to our boss. This guy you wooden believe his name is marian moonwell who we call big moon behin his bak. i never saw nobody lik him the way he gets aroun. he was chewin me out the other day for not turnin final with my wheels down and for i could tell him why he was on the way to the hanger cuz he saw a meck jackin up a plane by hisself alone. then he stopped to chew out avery an nother pilot in our outfit made him go back to the locker for his hightops. that guy is in more places at wunce than a cat got fleas.

i don mind tellin you this outfit is a hard livin hard fitin outfit. we got other karactors to that i haven tole you about lik the maintnunce guy. we call him quickburn cuz he get so mad if we even bend these birds a tiny bit an if we bust wun up he wont speek to you if you git bak. he wurks all the time cuz 2 nites ago i got bak rite aroun midnite an tole him the plane wusnt no good. he made me go to the plane walkin way out in the toolys in the rain and show him evera thin that was rong an rite on a peece of paper what i did. when i got up the mornin durn if he wuznt still ringin out my plane with 4 guys. no wunder hes so mean he don sleep.

well we wuz sippin this booze when mae the big blonde who runs the gurls in this joint says she thinks we had enuf. i tole her we was gonna rite you a letter to tell about us an she says thanks for thet artckle about pilots wife error an how she only had 1 guy to worry about an mae got all us guys to keep happy. ps she need help.

Well thas all fer now. we gotta 2 day alert to git reddy for. some guys from washinton is supose to drop in howdylike and big moon sez no more booze til they go an when he speeks we lissen.

yours for safe flyin
manny

ps you know that chopper pilot who spoilt your vizit to hanoy hilton when he piked you up all shot to – hiz buddy is in our outfit an sez watch how you flop your negutiv whatever that means. we gotta rekroot more pilots pretty soon an if you know some guys who wanta make good money flyin and have lots of laffs send me names of em so i kin rite an line em up. this aint no kareer lik the navy but it beets pedlin apples.

• Dear Manny,

The technological parameters interfaced with a proliferating and polarized infrastructure and conditioned by environmental and emerging excellence of staff predictions can stabilize an already existing methodology. This is not to ignore a subsequent reaction by the designated preserver of a sophisticated and impenetrable sanctuary. However, the penetration of the counter-value structure can aggrandize the expertise of the collaborators and neutralize an otherwise environmental potential which with sophisticated managerial constraints can serve to develop a collateral liberal restricted lodgment of successful endeavors.

In other words, it's awful gud to hear frum ya and tel everbody HEY!

Editor

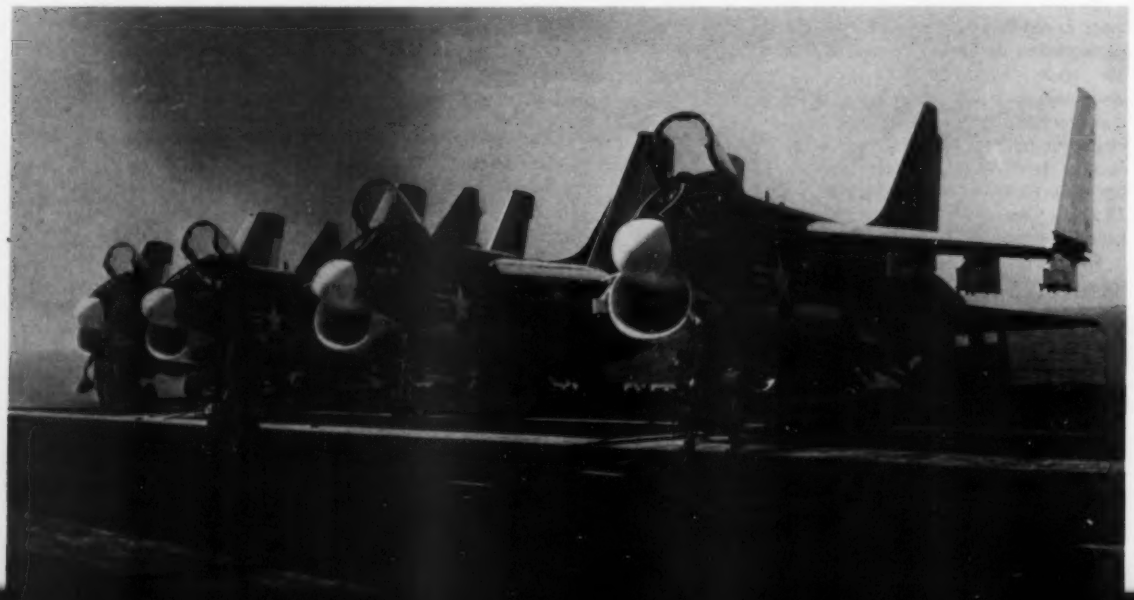
Planning
for the Unplanned

BE AWARE

CONSIDERING the broad range of flight activity which goes on daily within naval aviation, it is not unusual to have the unusual occur. Of course, many – maybe most – flights go pretty much as expected, but not all. Consequently, the naval aviator is well-advised to *plan for the unplanned.* This may seem like a large order because at first glance there appears to be no logical way to do this. However, there really is a way to *plan for the unplanned* . . . naval aviators have been doing it all along, to a greater or lesser extent . . . but they have been doing it under other names. To amplify:

- Fatigue is a well-known word and one well understood by most. Most pilots take reasonable care to avoid flying when they are overly tired because it's just good headwork. They know they will have reduced capability to cope with the situation if they experience an emergency. So, in reality, this is a form of *planning for the unplanned.*
- Complacency is another word which is well understood. Most naval aviators know that regardless of how many hours they have in the air, or how many times a certain type of flight has been performed in the past, the cockpit of an aircraft is no place for a lackadaisical attitude – or even for a very relaxed attitude. Consequently, the need to be alert for unexpected developments has become a way of life for most naval aviators. This is one more way of *planning for the unplanned.*

Many other words could be trotted out and discussed to illustrate how naval aviators can and do *plan for the unplanned.* However, they can all be included in the catchall phrase, "be aware." This could be taken in the negative sense of *beware*; however, it need not be so. The advice to *be aware* of what you are about at all times can be most effective if applied in a positive manner to all functions and areas associated with flight, even to the process of taking a calculated risk, if need be. Consider in a personal vein some examples of ways in which this advice can be applied positively.



Flight Planning

You're planning a cross-country flight to a destination within easy range. There is no apparent need to employ maximum range flight planning procedures in order to get to destination. Are you going to be content to arrive over the destination airfield with the same fuel reserve you employ at home field? Or, will you *be aware* of the fact that the destination airfield is in a high density traffic area and landing delays are common even in the best of weather?

Accepting Aircraft for Flight

You're down in the line shack looking over the yellow sheet for the aircraft you have been assigned. The UHF ADF has been griped three or four times during the last two weeks. The only corrective action noted is "Ground checks OK." Are you going to take the aircraft? This question misses the most important point. It is not so much a question of whether to take the aircraft but, rather, a question of whether you are going to recognize the probable limitation of this piece of equipment during the flight you have in mind. In other words, are you going to *be aware* in the positive sense of using this information to improve the odds for a successful flight?

Preflight

You start around the aircraft, run your hand along the nose section as you move. It feels smooth, reassuring to the touch. You notice the fasteners for the nose section are flush. You rotate the angle-of-attack probe back and forth and note that it moves freely. To this point, everything seems right so you continue around the aircraft. The question now is, will you make the rest of the trip around the aircraft in this same careful way or will you do it in a perfunctory, thoughtless manner, encased in a cocoon of thoughts about other places and other things? That is, will you *be aware* that this preflight is the most important one you have ever made? Will you *be aware* that this is the time and place to give the aircraft a final, penetrating inspection in order to assess its readiness for flight?

Takeoff

You're at full power, lined-up for takeoff. You release the brakes and roll. A few seconds later, you're rotating for takeoff. The aircraft breaks ground. You bring the gear up and reach for the flap handle. When you operate it are you going to *be aware* of what all this means? Will you wait for the recommended speed and altitude or will you pick up the flaps as soon as you can? If you make it a practice to comply with standard procedures you'll wait until reaching the NATOPS recommended speed and altitude. But, NATOPS notwithstanding, if you took the time before flight to

really digest that tidbit of information on the yellow sheet about a slight longitudinal control instability you will *be aware* that it's not good headwork – at least in this case – to fudge on flap retraction speed and altitude.

In Flight

• You're flying along under positive radar control. You are referring to your FLIP charts as you go along, noting your position and the fact that you are well above the minimum obstruction clearance altitude. You receive a vector which will take you out of controlled airspace depicted on the FLIP chart. Will you *be aware* that your FLIP chart will not provide you with the minimum obstruction clearance altitudes in uncontrolled airspace (except for minimum safe emergency altitudes depicted on approach plates)? Will you *be aware* that, even though controllers have a very definite responsibility not to vector an aircraft into any area below a safe altitude, it is still your responsibility to maintain safe terrain clearance at all times insofar as you have the capability to do so?

• It's a beautiful, clear day. You have nothing to do but maintain heading and altitude for the next 50 miles. You decide to look around the cockpit, check out this piece of equipment, then that piece. You become rather engrossed in what you are doing. Will you bury your head in the cockpit for maybe 60 seconds while doing this *or* will you *be aware* that two aircraft can easily have a closing speed of 20 miles per minute, even on a beautiful clear day like today?

• You're flying along under positive control. You recognize a hazard to safe flight is developing . . . a traffic conflict . . . or maybe a severe thunderstorm looms in your path. You are unable to get amended clearance – or maybe you don't even have time to ask for it. Will you *be aware* that a pilot in command of an aircraft or flight has the emergency authority to take whatever action is necessary to ensure the safety of his flight at all times?

• You're checking out an experienced pilot in a new model aircraft. He's having trouble in the landing pattern getting the hang of it. His turns are too steep and his rate of descent is too high. You caution him but don't take the controls because you know first of all that he's an experienced pilot and you have a lot of faith in his ability to correct his errors. Secondly, you know he's not going to learn much if you fly the aircraft for him. Will you *be aware* that there is a fine (if indefinite) point beyond which you cannot allow the pilot under instruction to proceed and still fulfill your responsibility as an instructor?

• You're flying along at altitude when you spot a strange (but friendly) aircraft. You make an inviting pass; he responds. Soon you are canopy to canopy, getting ever lower and lower. Neither one wants to be

the first to quit. Will you *be aware* that this is only one of a number of potential hazards which can result from unbriefed, unplanned aerial combat maneuvering?

- You are over a mountainous area and spot a pass. On impulse you decide to descend to low altitude and fly through the pass at high speed, being careful of course to maintain regulation minimum altitudes. Before doing so, will you *be aware* that turbulence associated with mountainous areas can be severe enough to destroy an aircraft under low altitude, high speed conditions? Most important of all, will you *be aware* that doing anything in an airplane, *on impulse,* is a risky business at best?

The Approach and Landing

Of course you make all types of approaches and landings at one time or another but consider your next plain, old-fashioned VFR break, approach and landing. Will you *be aware* that very high speed breaks, steep turns and uncontrolled high rates of descent, have turned many VFR approaches and landings into hazardous undertakings?

Taxi Back to the Line

This chore can seem deceptively simple if you do not take care to *be aware*. The next time you do it, will you *be aware* that it is possible to taxi a time bomb into the fuel pits (hot brakes)? Will you *be aware* that you could taxi into a ditch at night if you fail to recognize the value of a taxi light? Will you . . . etc?

Postflight Inspection

This is a detail which is all too frequently overlooked. When you next taxi into the chocks, will you *be aware* that the postflight inspection is one of the most productive ways in which an individual pilot can contribute to good maintenance?

Be Aware

In the process of emphasizing the words *be aware*, we have suggested a number of specific hazards to safe flight. It is certainly to be hoped that readers will carefully consider these specific hazards but it is even more important that every reader consider the need to apply the concept of constant awareness to all functions related to flight. *Be aware!* ◄

TA-4J Elevator Control Discrepancy

A STUDENT pilot slightly overrotated the aircraft on takeoff. Recognizing this, he decreased the attitude to 16 units angle-of-attack but then the attitude of the aircraft again became excessively nose-high. The student informed the instructor in the rear seat that the aircraft did not feel right. The instructor took control with the aircraft very nose-high and in heavy buffet. The control stick would not go full forward.

Believing he had a runaway trim, the instructor overrode the trim by emergency means, dropped the RAT and simultaneously rolled the aircraft into a high angle-of-bank to bring the nose down. Upon recovery, the aircraft again pitched nose up, but with full nose-down trim applied, was controllable. Now able to more thoroughly troubleshoot the situation, the instructor realized he had a partial horizontal stabilizer disconnect. He disconnected the flight controls at altitude and returned to the field for an uneventful landing.

Postflight inspection revealed that incorrect connecting of the elevator power package following a test flight disconnect caused the problem. By intentionally setting the power package in such a manner that the locking jaws rested against the locking bar vice fully seated, the identical situation was set up wherein full hydraulic aft stick was available, but only about two inches of forward stick could be attained.

Both pilots stated that their poststart checks had included a cockpit wipeout of the control stick but they did not remember going full forward on the stick. Controls were again checked before the takeoff roll, but it is likely that the circular motion of the control stick did not include enough forward movement to detect the malfunction.

Maintenance procedures for reconnecting elevator power packages have been modified in the squadron concerned to preclude recurrence of this problem. This includes:

- Prior to reconnection, the trim is set at full nose-up, thus allowing considerably better visibility in the subject area than possible through the sighting holes.
- After reconnecting the elevator power package, the aircraft is turned up or hydraulic power is applied and the flight controls are checked for full deflection.

In addition, all pilots have been briefed that the cockpit wipeout must include control deflection in *all* quadrants if a valid check is to be obtained. ◄

F-4

Tail Section Fires

TWO F-4 tail fire accidents have recently been reported to the NAVSAFECEN. Since 1966, the F-4 community has experienced seven tail section fire accidents resulting in the loss of four aircraft and substantial damage to three. A serious trend is evidenced by the fact that six of the seven mishaps have occurred since February 1969, including three since October 1970. Additionally, incident/UR reports concerning aft fuselage fuel vent line leaks and failed dive vent valves have markedly increased in the past several months.

Investigation of the two most recently reported mishaps revealed No. 4 dive vent valve failure and aft fuselage insulation blankets soaked with fuel. A hydrostatic check of a vent line coupling assembly (Wiggins fitting) from one of the mishap aircraft revealed gross leakage caused by a deformed and dented coupling. Indications are that the second mishap aircraft had a leaking vent line but the particular component has not been identified.

The five previous tail fire mishaps produced nearly identical symptoms as the two most recent mishaps. The dominant facts associated with the seven accidents are as follows:

- Six of the mishaps occurred while aircraft were engaged in air combat maneuvering. The seventh mishap was experienced subsequent to a bombing run.
- Afterburner was being used in all cases at the time of the mishap.
- Wingmen observed excess fuel venting or streaming from aft fuselage section in five of seven cases.
- Pilots of mishap aircraft reported what they considered a "compressor stall" in four cases, this in all probability being the initial explosion.
- Wingmen observed aft fuselage fire or unusual afterburner flame pattern in all cases.
- Pilots' first cockpit indication was generally a utility failure.
- Fire-warning/overheat lights illuminated in only two cases.
- Loss of flight control occurred in two accidents as fire spread to stabilator package.
- Each mishap involved a Navy F-4.

What appears to be a significant factor is that with the exception of one Marine F-4 incident the remaining accidents/incidents/URs have been F-4s deployed aboard carriers or routinely used for carrier qualifications. Informal liaison with the U.S. Air Force Safety Center indicates that the Air Force *Phantom* community is not experiencing this problem. Apparently F-4 aircraft routinely engaged in carrier operations are more susceptible to dive vent valve failure than F-4s not involved in carrier operations. This may be attributed to fuel surging against an open dive vent valve during carrier arrestments forcing the valve to the aft stops with sufficient force to introduce permanent set in the support arm. The bent support arm then prevents proper valve seating, allowing excess fuel from the No. 4 fuel cell into the vent system.

In 1969, all seven of the *Blue Angels* (U.S. Navy Flight Demonstration Team) aircraft had failed No. 4 dive vent valves (PN 301500-5) and were replaced with a modified valve (PN 301500-7). (Note: The dash 7 valve is a dash 5 valve with the aft support stops ground off to permit 180-degree flapper rotation vice 60-degree rotation.) Prior to acceptance by the *Blue Angels*, these

NAVAIRSYSCOMREPLANT msg 062048Z of April 1971 indicates a proposed IAFC (interim airframe change) is under preparation. It is expected that this IAFC will specify inspection of the No. 4 dive vent valve and modification of undamaged valves by removal of the 60-degree stop. In addition, it will promulgate procedures for inspection and pressure check of vent line and will change MDC requirements. The referenced message also indicates that a formal AFC (AFC 530) will replace all dash 5 valves with new dash 7 valves. (A contract for the new valves has been let with an estimated delivery date of April 1971.)

aircraft had experienced numerous carrier and FMLP landings. Since installation of the modified valve, the *Blue Angels* have had no reported failures. This further associates dive vent valve failures with the carrier/FMLP environment.

Mishap reports indicate a leaking aft fuselage fuel vent line is caused by improper coupling connections, loose drain tube B-nuts and dented or deformed connections preventing a leak-free coupling.

A failed dive vent valve combined with a leaking aft fuel vent line during tactical maneuvering with afterburner operation, such as in air combat maneuvering, forms a set of conditions for a potential tail fire.

If the present trend continues, the F-4 community can expect additional tail fire accidents associated with a failed No. 4 dive vent valve and/or a leaking aft fuel vent line.

Furthermore, a potential exists for a fire even with a properly functioning vent system. It has been noted that on occasion, vented fuel passes out of the low point drain of the vent line and, rather than dissipating in the airstream, follows the contour of the tail section up to the drag chute door. If the door is properly sealed, evaporation will normally take care of the situation, but in cases where drag chute door seals are faulty, fuel will seep in and soak the chute, offering a combustion source. As these door seals are subjected to considerable abuse in normal operation, their integrity should be checked periodically and new seals installed when needed.

Pending further investigation and incorporation of corrective fixes/issue of revised maintenance procedures, the following is recommended to reverse the trend:

- All F-4 aircrews be alerted for excess fuel venting and unexpected disparity in fuselage fuel indications between aircraft of the same flight. Be particularly vigilant during air combat maneuvering and similar high-G/afterburner maneuvers.
- Ensure that all supervisory personnel are apprised of the disastrous consequences of a failed dive vent valve and/or a leaking fuel vent line.
- At first sign of excess fuel venting, terminate afterburner, if engaged, and land as soon as practicable.
- Caution maintenance personnel at all levels against using fuel vent lines/vent mast for hand and foot holds during aft cavity maintenance and reemphasize the importance of proper leak-free coupling connections. ◄

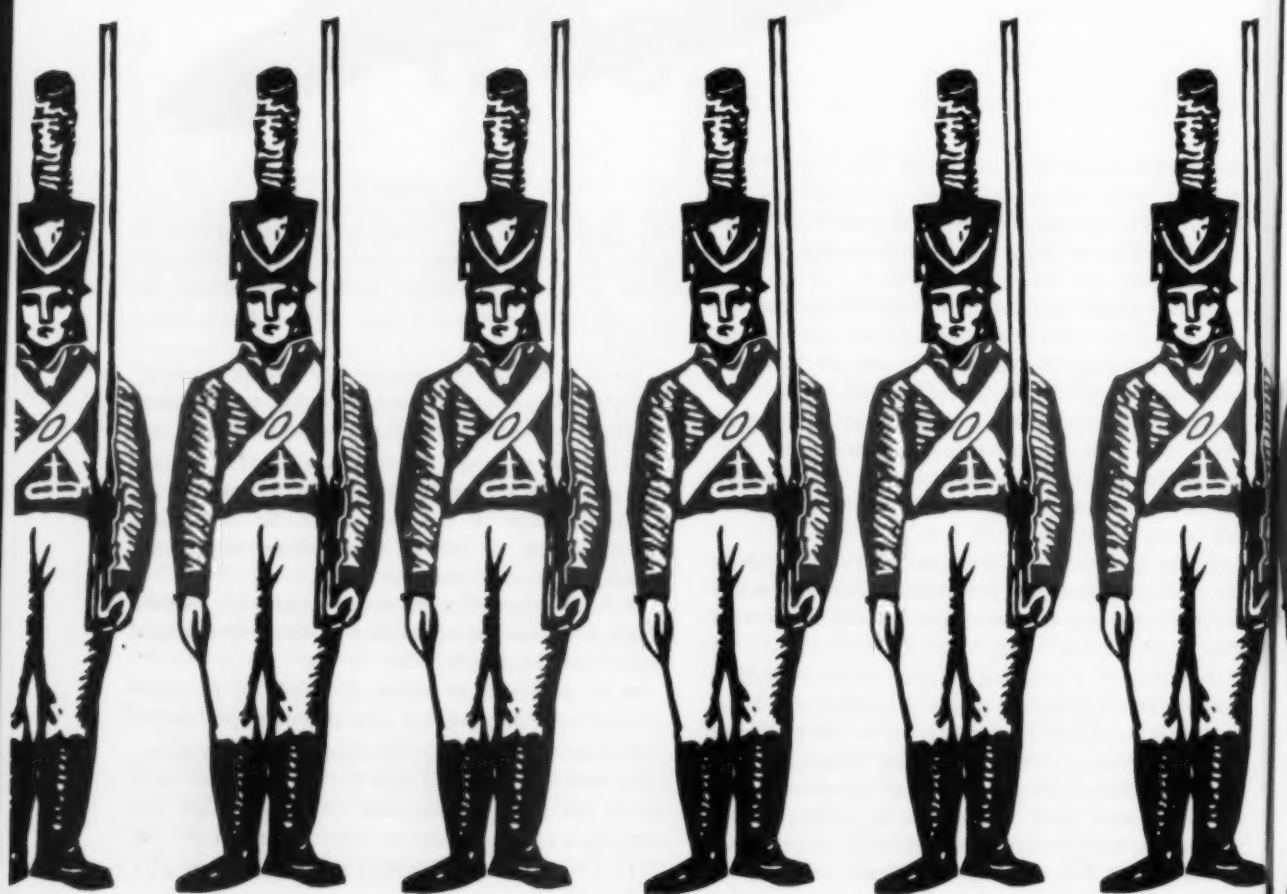
NAVSAFECEN Flight Advisory 2-71

Manhood vs. Safety

By Chaytor Mason, Aerospace Safety Alumni Review

ONE of the curious curses of our culture is the conclusion that anyone interested in his own safety is far too frightened to play the game well, or to give the job its fullest measure, and that, therefore, he should be sacked on the spot.

This is a sad but realistic truth relating to man's own appraisal of manhood. When it comes to "being a man," the average proud male cannot satisfy himself with buckling his biceps. Some secret spark of pride also directs that, should the occasion demand, the man will be willing to conduct himself like an utter boob, disregarding all precautions – expressed or implied – in the performance of almost anything that will prove he isn't a sissy.



We've lost a lot of good men that way. And some of the characters, classed as sissies because they have at least a small regard for their own skins, manage handsomely to survive, live to see another day, and, in the process, contribute magnificently to the total goal.

This seems to be today's unsatisfactory, unsafe story of safety education, be it flight safety, highway safety, or even something as relatively minimal as household safety.

Let's flash back a few years: The first match game of baseball was played in Hoboken, N.J., in 1846. It was a bare-handed game, and the first teams played with the same, hard-rock ball used today; the baseball glove hadn't been invented. Caught with bare hands, the ball broke hands and split thumbs, so not every catch was a lucky one!

And so it went, along its maiming way, for 25 years, until, one sunny day, Charlie White, first baseman for Boston and tired of sore hands, came onto the field wearing a thin, but nonetheless protective, glove. He never got a chance to use it. He was laughed off the field with a chorus of catcalls: "If ya' that scared of th' ball, don't play" . . . "catch the ball, don't MUFF it!"

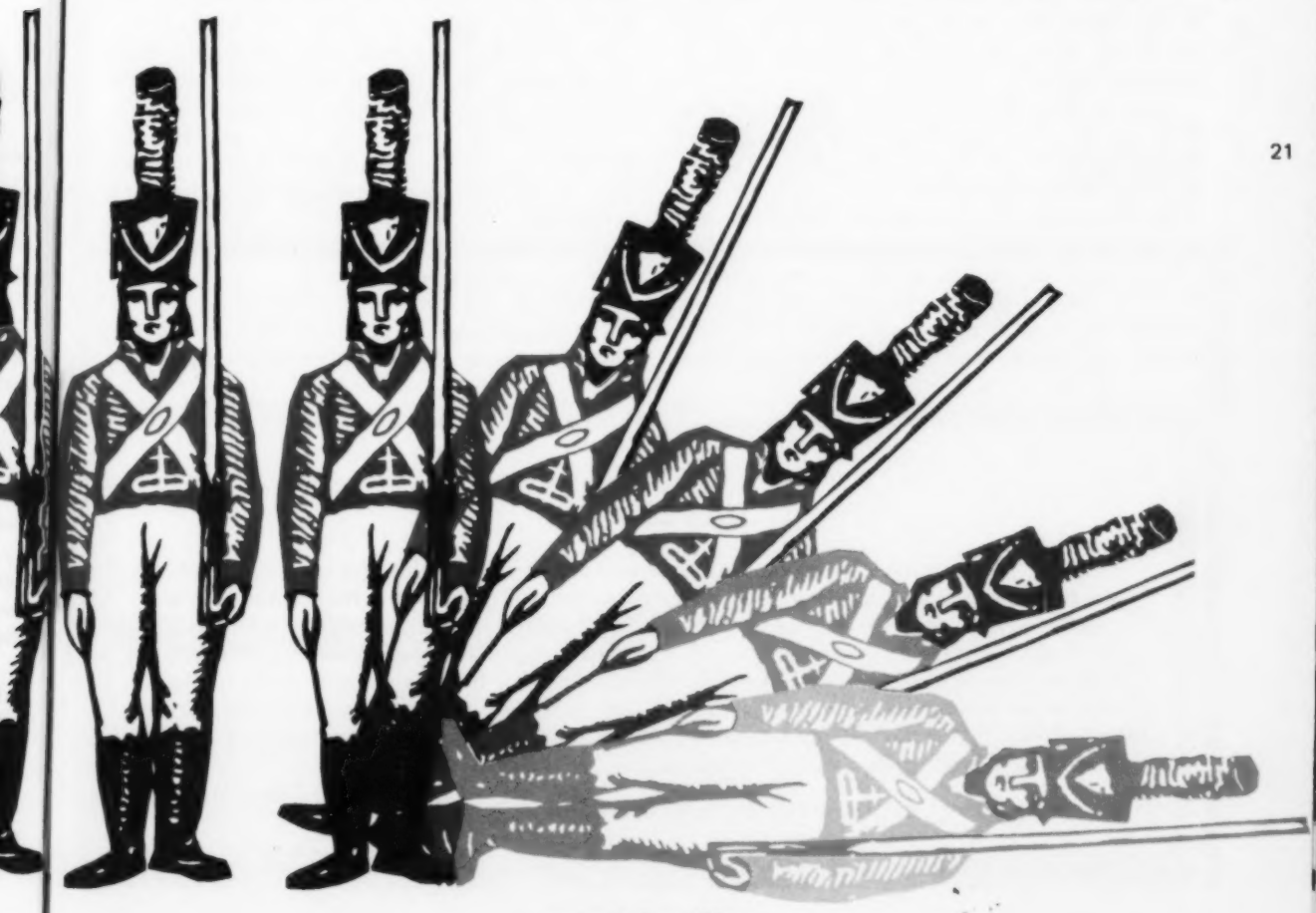
Gloves were not worn on an American baseball diamond for another five years. And baseball went through the same trials in the evolution of a catcher's mask, a chest protector, and even today's hardhat.

Football, you will remember, fared no better in the development of "safety appliances." You also may recall that it has been only a few years since one of these bits of evidence for superior manliness was the cool defiance demonstrated by a quarterback heaving his heavy helmet heavenward. Now *there* was a man who would lead the team to victory, the fans said.

No matter what the game, the story has been essentially the same. You saw it in baseball, football, hockey, boxing – or that grimmest game of all – war.

Even in war, the development of life-protecting headgear, garments, and practices historically has been considered a vile form of cowardice – unmanly and even unpatriotic!

In the American Revolution, the soldiers of his



Britannic majesty, George III, wore brilliant red coats and white pants and marched in bold, shoulder-to-shoulder formations against the sharp-shooting guerillas of the day. The Redcoats never really got the idea.

And, about 140 years later, the French poilus and the British Tommy Atkins' were again marching off to war wearing crimson hats of cloth. Without so much as a change of uniform, they moved from the sidewalk cafes in Paris to the battlefront. With little more ado, they faltered and fell before the machine guns of the Germans, who happened to have been wearing very hard hats at the time.

Resistance to hardhats and the protection they afford was not necessarily a soldier-of-the-line idea. Despite directives from superiors, local commanders resisted trading off the bravado of the bright and soft hat for the dull steel helmet. One British commander went so far as to declare that anyone in his command who wore a hardhat would be court-martialed on the spot for "cowardice in the face of the enemy."

It was just another case of a man trying to prove that he – as well as those in his command – weren't sissies, and could firmly establish their manliness just by flaunting safety!

Come to think of it, have you ever seen a picture of World War I's Black Jack Pershing, or World War II's Douglas MacArthur, wearing anything but a soft hat? What were they trying to prove?

And then there was the firebrand of the ETO – Old Blood and Guts Patton. He wore his hardhat, or at least a helmet liner, all the time. But he had to prove how tough he was by insisting that the vehicles in his command move with tops down – and to hell with whatever Old Man Weather happened to be dropping off at the time.

There are other stories and other examples, and you can supply your own variations to the theme. But the essence of it all is simply this: We can talk about safety as a hoped-for ideal, but we will not even go through the motions of doing things safely unless they do not disturb our own ideas of what is manly.

It also means that, *unless we make some sweeping changes in our own thinking about safety and about its relationships – if any – to manliness and all the business of being a man, we will continue to have the same old disappointing safety statistics year after year* – in the air, on the highway, even in the home.

In the field of aviation safety, we can expect that the accident rate for junior flying officers will continue to be high because they are "manly" young men who are trying to prove themselves. But the same rates may apply for those officers in their "dangerous forties" who are trying to reprove their manhood all over again.

Probably we will arrive at no improvement at all, in the matter of safety, until we reevaluate "manhood." First of all, this must be a personal reevaluation. Is a MAN the one who runs headlong into a well-camouflaged machinegun nest, knowing it means sudden death? Or is the real MAN the one who flanks the nest and throws in the destroying grenade?

Is a MAN the pilot who says "give me a plane and point me toward the target" . . . or is it the one who says, "a flak vest and a hardhat will help me on this mission"?

It is a strange heritage which decrees we are MEN only when we disregard caution!

And all the safe-flying, safe-driving and even safe-living campaigns in the world will be of little avail until we conclude that *being safe isn't being sissy!* ◄

SAFETY TIP

FLIGHT equipment is based on proven requirements. Several recent accident investigations have revealed that aircrewmen were not fully equipped, that equipment was not effectively used, and that unauthorized modifications had been made. Complete and proper use of flight equipment is essential to ensure support "as advertised" in emergency situations. Squadrons must have functional procedures for training, issue and use of flight and survival equipment. Our goal is to provide the best gear thoroughly tested for its intended use. If deficiencies are identified, local ideas and modification are highly desirable but must be submitted for test and prior approval for the benefit of all users.

COMNAVAIRLANT Weekly Safety Bulletin

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Detective Story

RECENTLY, personnel from the U.S. Coast and Geodetic Survey Service located a submerged object which posed a hazard to the channel at Little Creek, Virginia. HCU-2 (Harbor Clearance Unit Two) based at the Amphibious Base was called upon to remove the hazard. When they recovered the object, it turned out to be parts from an aircraft.

HCU-2 contacted the Naval Safety Center who sent an aircraft accident investigator to Little Creek to determine whether or not the parts were from a naval aircraft. He found that the parts consisted of a propeller blade and engine nacelle, minus the engine, which was apparently from a naval aircraft as indicated by the blue paint on the nacelle.

The investigator contacted the Hamilton-Standard Co. representative at the NAVAIREWORKFAC (Naval Air Rework Facility) Norfolk, who made arrangements with the NAVAIREWORKFAC Propeller Shop foreman to see if any identifying marks might still remain under the crust of barnacles.

The following morning the prop was delivered to NAVAIREWORKFAC and by midmorning it was found that the blade was an Aluminum Curtiss Electric Prop Type C-5325D-82, Serial No. 35818, Drawing No. 89324-6. This data was taken to the NAVSAFECEN Technical Library where research revealed that this particular model prop was used by only one type naval aircraft, the PB2Y-3 *Coronado*.

By noon NAVSAFECEN Records and Data Processing personnel were probing the files of missing aircraft by type and location. Within the hour a reproduction of the aircraft accident report was handed to the investigator. It showed that the aircraft was indeed a PB2Y-3 which sank in Little Creek Harbor during rough water landing trials on 21 March 1943.

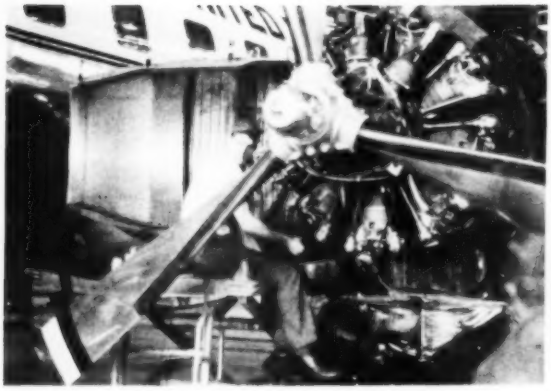
Although this type of aircraft accident investigation is a bit out of the ordinary for the Naval Safety Center, it proved quite rewarding. By using the little information available, it was possible to probe the Center's research facilities and single out an aircraft accident which occurred 28 years ago. ◄

Headquarters Squadron Celebrates 1Y

HEADQUARTERS Squadron, Fleet Marine Force, Atlantic, was commissioned on 1 July, 1960, with the mission of administration to assigned personnel and providing aviation support for Headquarters, Fleet Marine Force, Atlantic. Prior to commissioning, the unit was designated Headquarters Flight Section, Air, FMFLant. The current Table of Organization reflects seven officer and 67 enlisted billets. Five of the officers are naval aviators and two are ground; Maintenance and Supply. The Squadron is Commanded by Lieutenant Colonel D. Prudhomme, USMC, and its XO is Major L. Duke.

Currently the Squadron maintains and flies the C-131 *Samaritan*, the C-54 *Skymaster*, th maj VH-34 *Seahorse*, two T-28 *Trojan* itse and three US-2 *Trackers*. Oth rec aircraft maintained during the pa whe 15 years include the C- tho *Navigator*, C-117 *Skytrain*, T-1 flo *Sea Star*, T-33 *Shooting Star*, TF- diff *Cougar*, and the F9F-5 *Panther*. mis

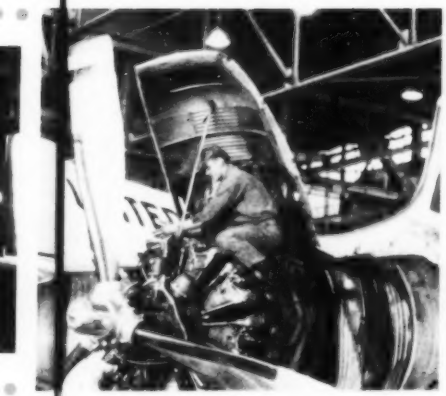
March 18th of this year marks Sta the completion of 15 years Cer



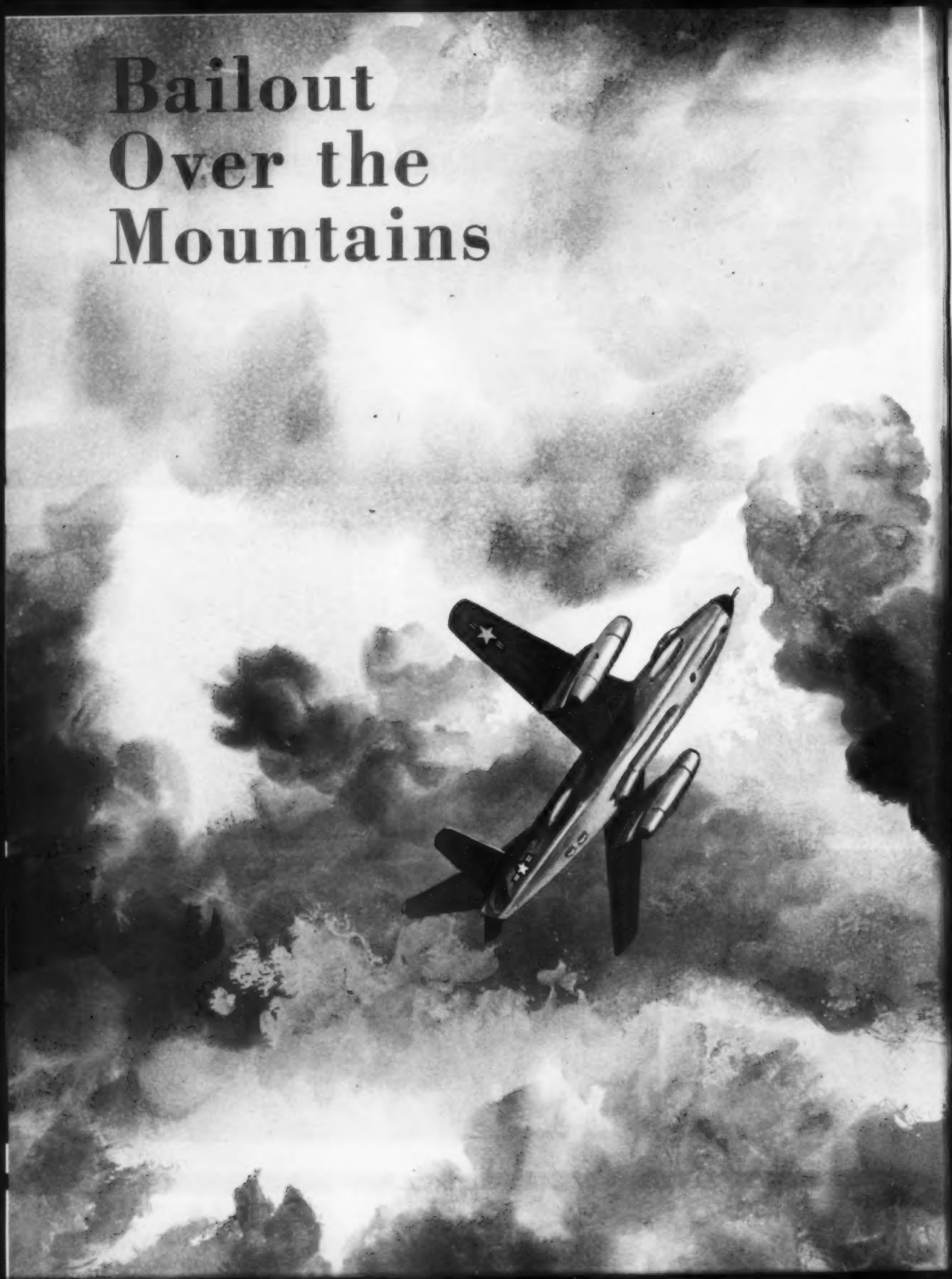
s 1 Years of Major Accident-Free Flying

major accident free flying which in itself is significant. However, this record becomes more conspicuous when it is considered that during those 15 years the Squadron has flown and maintained eleven different types of aircraft on missions throughout the United States, Europe, South America, Central America, Canada, the Caribbean, and the Middle East as well as providing staff aviators with vehicles with which to complete annual minimum flight time requirements.

The Squadron's total major accident free hour figure is just short of 50,000 hours, a figure which has been surpassed on several occasions by squadrons flying a single type aircraft. However, because of the unique mission of Headquarters Squadron, the variety of aircraft types it has utilized in accomplishing that mission, and the myriad of transient pilots who flew those aircraft, its fifteenth safety anniversary is a singular contribution to the Marine aviation safety record.



Bailout Over the Mountains



THE ONLY recorded bailouts from an A-3 last year were 100 percent successful but it was nip and tuck for a while for the four-man *Skywarrior* crew.

Bailout from the EKA-3B took place in snow and freezing rain over the Rocky Mountains. The first man went out at 20,000 feet-plus and the last at 2000 feet above terrain. The two crewmen who went first spent 15 to 20 minutes in parachute descent because of chute actuation immediately after exit from the aircraft. Due to difficulties getting past the fourth crewman's unsecured seat, the ECM/evaluator and the pilot almost didn't get out of the aircraft at all.

In spite of adverse weather conditions, three of the men were rescued in a matter of hours. The fourth crewman spent an uncomfortable night at 11,000 feet on a mountainside before being picked up the next morning.

The Naval Safety Center has recorded the accident as cause undetermined, with weather (severe wing icing conditions caused stall/spin) and pilot (poor judgment by penetrating avoidable thunderstorm) as probable contributing factors. Mountainous operations and thunderstorm have been recorded as environmental factors.

How It All Began

Accompanied by two other *Skywarriors*, the A-3 was on the return flight to NAS Home Base after three weeks of operations aboard ship off the East Coast. Clouds were neither dark nor menacing, the crew told investigators later. "Thin and stratified" was the way the pilot described them. When a build-up loomed ahead, he was cleared to climb to FL240 to clear it. (The aircraft had no radar to tell what was in the cloud, the ECM/evaluator stated.) As the flight entered the clouds both wingmen lost sight of the leader and broke away. Shortly afterwards, both pilots reported breaking into clear areas between build-ups and both reported having encountered heavy precipitation and icing.

The lead aircraft got caught in an updraft and the cockpit darkened because of rain.

The ECM/evaluator stated, "I had no idea at the moment what had happened and I don't think anybody else did either. All of a sudden we were thrown up in the air 6000-7000 feet higher than we were supposed to be."

The next sensation recalled by the crew was that of falling rapidly. After the aircraft was in the clouds for several seconds, the nose pitched up rapidly to 60 degrees and airspeed began to drop rapidly. The pilot applied corrective measures but was unable to regain control and commanded bailout.

Continued

"Once clear of the aircraft, I pulled my D-ring with my left hand, then transferred it to my wrist to save it."

Man in the Fourth Seat

The man in the fourth seat remembers simultaneous moves to blow the escape hatch.

"Three hands grabbed for the hatch blow-down handle at the same time but I believe the ECM/evaluator was the one who succeeded. When the first bailout command came I immediately began to prepare. As soon as the escape chute was open I crossed my hands, grabbed the overhead bungee strap, twisted my body around and slid under the fourth seat in less time than it takes to say it. *(The fourth seat was not locked in the up position. – Ed.)*

"As I went out the hatch my helmet caught on the fourth seat and was torn off along with my glasses, the chinstrap almost breaking my nose in the process. Nevertheless, I made it out quite rapidly. Once clear of the aircraft, I pulled my D-ring with my left hand, then transferred it to my right wrist to save it. *(Pulling the D-ring so soon caused him to have a slow 15 to 20 minute descent. As a result, and also because he had lost his helmet, he sustained mild frostbite.)*

"Somehow my seat pack had slipped down almost to my feet but it was still fastened. I looked around and then I was in the soup – it looked like I was in a bowl of milk. Then I ran into hail and snowstorms for quite awhile and was covered with ice. I don't know just how long I stayed in the hail and snow but it seemed like about three hours! Finally when I looked down I saw what seemed to be ground coming up to meet me through the thick haze." *(We will continue with the fourth man's survival experiences on the ground a bit later.)*

Crewman/Navigator in Third Seat

After the fourth man had escaped, the third crewman reached down and pushed the fourth seat against the bulkhead again and bailed out.

"I had trouble exiting," he said. "I felt I was being pressed against the lower hatch by G forces but I departed quickly when my feet reached the slipstream. I then experienced a sudden hard jerk and discovered that my chute had deployed. Immediately I turned my PRC-33 emergency beeper on and pulled its flexible antenna out into the airflow. Right after this I noticed that two panels in the chute were ripped. I descended into a violent hailstorm. In a few seconds everything began to ice up. It was at this time I realized that I had lost my helmet – my hair turned to icicles. I had also lost most of the feeling in my hands. *(The crewman was not wearing his gloves.)* After this I descended into a snowstorm, then into a rainstorm. At times I felt I was being swung at 90 degree angles to my chute. I think that as I departed the aircraft my ripcord must have caught on something and actuated my chute because my descent lasted at least 15 to 20 minutes." *(The investigating flight surgeon believes the crewman's D-ring caught on the fourth seat.)*

Because of his lengthy descent, the third crewman also sustained mild frostbite.

ECM/Evaluator

Next to go was the ECM/evaluator.

"The first two people went out somewhere around FL200 or FL220. Recommended bailout procedure in the A-3 is the fourth man goes out first, then the third man, the second man and the pilot last. You go out in a feet-first position. However, I chose to go out head first as it seemed to me at the time it would be quicker. I just rolled out of the seat and was going to dive down the hatch.

"I noticed that the jump seat where the fourth man sits was about half-way down over the escape chute and was waving up and down in the breeze. Most generally, with a crew of three, which the airplane normally carries, this seat is secured in an upright position so it can't come down. However, with the fourth man in there it was loose. [1]

"I went down the hatch a little way, then all of a sudden stopped. *I couldn't get out.* I don't know what made me realize what had me caught, and even now I'm not really sure, but I believe that I got my parachute caught on the jump seat. I couldn't go down any further. Naturally the pilot was trying to hurry me along and he tried to shove me on through the hatch. I was flailing around, trying to get out any way I could. Then I don't know what made me do it but I raised back up with my weight on my left hand and with my right hand I shoved the jump seat up and the low pressure area outside the airplane just sucked me right on out. This is one thing to remember when you're bailing out of an A-3: *GO OUT FEET FIRST!*

"I got a pretty tremendous whiplash and I believe at this time I lost my helmet – it was torn right off my

[1] The fourth man was not aboard the aircraft in a crew capacity. The EKA-3B NATOPS states, "The presence of the fourth-seat crewman in the aircraft must be essential to the successful completion of the flight or be in support of the squadron's mission or assigned tasks."

head [2] However, I remember the feeling of pretty well having it made then and all I had to do was pull my D-ring. I remember reaching for my D-ring but I don't remember pulling it. I became unconscious and the next thing I knew I was on the ground on the side of a cliff, 50 feet from the burning wreckage of the aircraft. On landing, I sustained a broken jaw and a bad cut of my right knee."

Pilot's Bailout

The last man to leave the aircraft was the pilot.

"After I commanded bailout," he stated, "I continued to try to regain control of the aircraft but could not. The altimeter was unwinding and I believed the aircraft was in a spin. I unstrapped from the pilot's seat and was thrown into the right side of the cockpit. Both the No. 3 and No. 4 man had exited safely and the ECM/evaluator was hanging head-first down the escape chute. I figured he was hung in the straps and began working to free him. I pulled some of the straps away from him and he fell from the chute. (I found out later that the fourth seat had trapped him in the aircraft.)

"After he left the aircraft I followed immediately. I pulled the D-ring on my parachute and got only a few swings in my chute before I touched down. (Bailout altitude was later estimated as 2000 feet above terrain.) I was still oscillating as I came out of the clouds right over the crash site and landed on a grassy hill about 50 feet from the impact point."

The pilot's only injury was a questionable small compression fracture of the fifth thoracic vertebra.

Survival/Rescue Episodes

Because of weather conditions the fourth man, the first man out of the aircraft, was the last one picked up. He spent an uncomfortable night in the rain on the side of the mountain.

"I parachuted down on a slope full of rocks and small grass and nothing else," he reported. "At first I just lay there thanking God that I had made the ground because in the storms above I thought I might have pulled the parachute ripcord too high and would be wiped out before I hit land."

After releasing himself from his parachute, he took off his torso harness and pulled the beeper out of his flight suit pocket and turned it on. Then he took stock of the other items in his flight suit – a cigarette lighter, some paper and a jackknife. He also had two flares in his Mk-3C life preserver and "a various assortment of goodies" in his seat kit.

He did not have the required survival vest nor did anyone else in the crew.

Believing he would not have to wait too long for rescue because of the two other planes in the flight, the fourth seat crewman settled down 50 feet from the top of a mountain ridge for "a restful wait until help came." The ridge on which he had landed seemed to be the

[2] No member of the crew was wearing an oxygen mask which would have improved helmet retention. Three out of four of the crew lost their helmets. General NATOPS (OPNAVINST 3710.7E) requires oxygen from takeoff to landing in pressurized combat and combat training aircraft.

"That was how I spent the night – in the raft which was like a big contour chair with soggy chute above and below and rain continuing all night long."

highest in the area. Some time later he walked up to the top and saw that he was above the tree line. Returning to his gear he inflated his raft and placed it where there were the fewest rocks.

"That little expedition left me quite tired because of the high altitude."

When it began to rain again he got under the covers on the raft and used his poncho from his seat kit to keep dry. In spite of his efforts, water leaked into the raft and every so often he had to empty it. Several times during the day and early evening he saw a SAR helo but was unable to attract attention with his smoke flares. As the sky began to darken, a twin-engine plane came over and he lit a night flare. When the aircraft came back toward him he lit a second flare which the crew acknowledged by blinking landing lights.

"My spirits rose 200 percent just to know someone had at last seen me," he recalled.

The aircraft circled, then departed. Darkness had fallen so the crewman prepared for the night. Until this time he had forgotten about his strobe light on his torso harness; now he placed it with the gear in his seat pack kit. He went up the mountain slope and retrieved his wet parachute which he folded in the raft with the poncho doubled in the middle.

"That was the way I spent the night – in the raft which was like a big contour chair with soggy chute above and below and rain continuing all night long. It was like sleeping in a warm pool of water only I didn't sleep and the water wasn't very warm."

Early the next morning the two-engine plane returned. The crewman uncovered his head and lit a night flare. Then he heard the welcome sounds of a helo. As the helo approached, he lit his last smoke flare to indicate wind direction. The helo came to the ridge top, a crewman jumped out to help him and two others picked up his gear.

Third Crewman

The third crewman ended his parachute descent in tall evergreens.

"I saw two trees about two feet apart approaching very fast. I grabbed one parachute riser and pulled hard to turn the chute. Nothing happened so I crossed my arms in front of my face, crossed my legs and somehow went between the two trees. I landed on my buttocks on a log with my chute hung up above."

The crewman tried unsuccessfully to retrieve his chute from the trees, then decided it made a good signaling device where it was. He climbed to the top of the mountain. There were five mountains in sight and many deep valleys but no sign of life or trails. He returned to his landing site and laid out his survival equipment for inspection.

At this point, realizing that his hands and feet were frostbitten, he found some dry wood and built a fire to rewarm them. Discovering that the trigger of his pencil flare gun was missing, he used his crescent wrench to fashion a workable trigger with a fishhook from his survival kit. He then inflated his Mk-3C and cut it up to wrap it around him so that he would be more visible. Unlike the fourth man, he had not hooked up his seat pan and, therefore, did not have a raft for shelter or poncho for signaling.

During this time he heard jets overhead but realized they couldn't get below the weather. Later a twin-engine prop came within three miles but the crew did not see his flares. He began to think about preparing to spend the night.

"While I still had enough daylight left I began to look for shelter. During my search I found a path about two feet wide and followed it. About a mile or so later I found a big paw print going in the same direction so I turned and ended up about a half-mile from my chute. At this time it was raining hard and it was cold.

"I found four evergreens bunched together and cut a space out inside. I was about to get comfortable when I heard a jet go over but ignored it because of the visibility problem. About five minutes later I heard a helo and got up. He was flying down the other side of my valley. I lit a smoke flare but he went on by. At the end of the valley he turned and came down my side. I lit another flare and he flew right by me but he saw me this time. He flew to the top of the mountain and hovered, waiting for me to climb up. One of the crewmen leaned out and pulled me inside."

The pilot and ECM/evaluator, who had touched down near the aircraft wreckage, were picked up by helicopter within an hour or so of the bailout.

Survival Aspects

Commenting on the survival aspects of this accident, the investigating flight surgeon pointed out that the loss of three out of four helmets during bailout probably would not have happened if oxygen masks had been worn. The ECM/evaluator's injury would have been minimized if his helmet had stayed on securely, the flight surgeon said.

"The head-first bailout of the pilot and ECM/evaluator shows that this is not a suitable method of escape," the flight surgeon continues. "It is very possible that the latter's cervical hyperextension (whiplash movement) caused him to be dazed so that he could not shield his face on impact with the ground. There is a chance that one could hit his head against the plane. The ECM/evaluator's getting stuck between the fourth seat and the cockpit and being unable to free himself because of his position almost proved fatal to both himself and the pilot.

"The excellent application of post-survival and rescue procedures supports the fact that survival schools are an invaluable aid in the training of naval air personnel. The U. S. Army rescue team (paramedics) stated that it was the smoothest rescue operation in which they had ever engaged." ◄

Hot Weather Survival

By George D. Banky
NAS LEMOORE

THE definition of the word "survival" can best be summed up by the following – "the ability to exist in a difficult situation." People suffer and die needlessly in survival situations, generally, for one or more of the following reasons:

- They lacked the few absolutely essential pieces of equipment necessary to cope with the "difficult situation."
- They lacked the knowledge to build or improvise a primitive shelter.
- They failed to remain calm enough to deal with their "difficulties" logically.
- They lacked knowledge of edible vegetation in the area to supplement food items carried.

From the west coast area we fly over or close to the Mojave Desert fairly often. It is the second hottest desert in the world with an official temperature of 134°F. With no plan or with improper use of survival equipment, death can result in a very short time. A man who finds himself down in the desert should not attempt to walk out of the desert – he should stay put, rig a shelter and signaling devices, rest and conserve body moisture and strength until rescued.

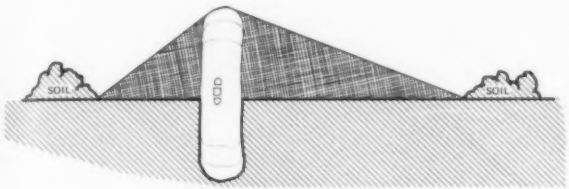
The greatest danger in desert survival is dehydration. Two-thirds of the human body is water. Only a slight loss can have adverse effects on judgment and physical being. A one to five percent loss of body moisture can result in drowsiness and nausea. A five to 10 percent loss can result in dizziness, headache, difficulty in breathing, tingling of the arms and legs due to poor circulation, indistinct speech and inability to walk. At a temperature above 95°F a loss of 15 percent of body moisture is generally fatal.

Clothing: If you are trying to survive in a desert, do not remove your flight suit. Keep your flight suit sleeves down and your flight suit zipped up. Try and keep your head and face covered as much as possible. Keeping your clothing loose and floppy helps to keep you cool. Keep your shoes on. Apply sunburn ointment to areas of the body not covered by clothing. Wear your clothing at all times even though you imagine it will be cooler to strip it all off. It won't be. Stripping off your clothing will cause your perspiration to evaporate too rapidly and you will lose its cooling effect too quickly. The rapid evaporation of perspiration speeds up the process of dehydration.

Shelter: Expend as little time and energy as possible on making your shelter, especially during the hottest part of the day, unless you plan to stay for some time. Do not attempt a great deal of active work until after sunset but rest and conserve your strength. The body uses water much more rapidly in the sun. While resting, inventory your survival equipment and consider a plan of action. In erecting your shelter take advantage of the

natural features of the terrain such as bushes, large rocks and depressions.

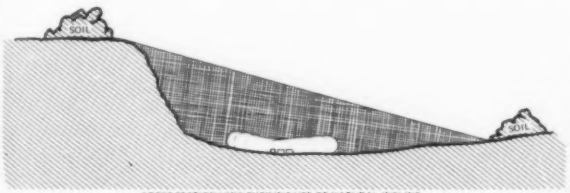
Parachute-liferaft shelter: Scoop a hole or trench in the sand or soil and bury your inflated liferaft approximately 1/3 of its length. Stretch your parachute over the liferaft and anchor it with sand at both ends. If possible, use a double thickness of parachute material and try to fluff for an insulating air space between the layers of material. (See Fig. 1)



CROSS SECTION VIEW SHOWING LIFERAFT USED TO STRETCH PARACHUTE TO MAKE SHELTER.

Fig. 1

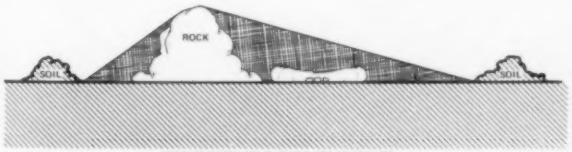
Depression type shelter: Find a natural depression or slope and scoop it out if necessary to make the incline steep enough. Anchor both ends of your parachute with soil after stretching it over depression. Place your inflated, inverted liferaft in your shelter for an air mattress. It is approximately 30°F cooler one foot off the desert floor. Leave the sides of your shelter open during the day for any breezes. The sides can be pulled down during the evening cold. (See Fig. 2.)



CROSS SECTION VIEW SHOWING USE OF NATURAL INCLINE TO MAKE SHELTER.

Fig. 2

Rock type shelter: This is the same as the depression type shelter. (See Fig. 3.)



CROSS SECTION VIEW SHOWING USE OF ROCK TO MAKE SHELTER.

Fig. 3

Water: The amount of water needed to sustain life varies from one pint to five gallons per day, depending on climate, exertion, health, body weight and the duration of reduced supply. The average man engaging in little exercise can exist on two quarts of water per day.

A ration of one pint per day can be maintained only a few days without definite bodily dehydration and loss of physical and mental efficiency. If a limited water supply is available, ration at no less than one quart per day. Control perspiration. In normal life we perspire one quart or more of water each day. In the desert we don't see it because it is evaporated as quickly as it is excreted from the pores. Move slowly, walk slowly and make all actions slow and deliberate. Take advantage of any source of water, fresh or salty, to soak your clothing to retard perspiration. Conserve perspiration – not water.

Drink available water as needed – do not ration your water. Eat little or not at all. Digestive processes require body water and hasten dehydration. Water is the only cure for dehydration.

A simple water-making device can easily be assembled and readily carried in your survival vest (Fig. 4). It consists of a piece of plastic approximately 45 inches square, a piece of plastic tubing the diameter of a drinking straw and 36 inches in length and two pieces of heavy duty aluminum foil approximately 12 inches square. *(APPROACH, February 1966, page 23.)* The "still" consists of a bowl-shaped hole in the soil about 40 inches in diameter and about 20 inches deep which is covered with the plastic film, formed and held in the shape of a cone by a rock placed in the center. Soil is placed around the edge of the plastic film to anchor it securely in place. Sunlight passes through the plastic and is absorbed by the soil, resulting in evaporation of water from the soil followed by condensation of the cooler plastic. Water drops form on the underside of the plastic, run to the point of the cone and drop into a container placed directly under the rock. A container fashioned from aluminum sheets can be used to catch the water.

In dry soil, such as usually found in the desert, the still will produce about 1/2 pint per day. The water-making capability of the still can be increased by lining the hole with vegetation such as the fleshy material in cactus. Brackish or salty water can be distilled or in situations where the soil is extremely dry and no fleshy plants are available, the still can be used to purify polluted water such as body wastes. Under good conditions, other than in the desert, the yield can be as high as three pints per day. It takes about one hour for the air under the plastic to become saturated and water collection to begin. Try not to disturb the plastic but drink as needed from the plastic tube. The still produces a reduced supply at night and on cloudy days. Continued

CROSS SECTION VIEW OF DESERT STILL.

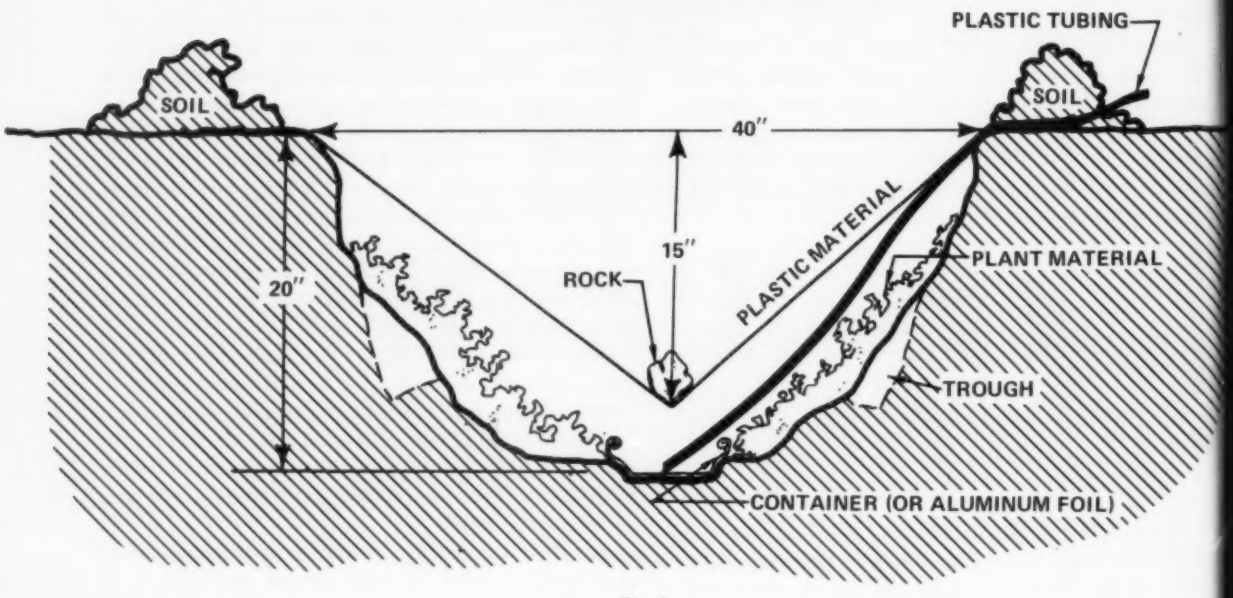


Fig. 4

Another hazard of the desert is sun blindness as a result of glare reflected from the sand. Use your helmet to protect your head from sunstroke and make use of the sun shield lens. Or make a sun mask out of fabric with two eye slits.

We will not go into all the equipment carried by naval aviators here, only the items of immediate concern. Your radio beacon and signaling mirror will be invaluable as will your signal flares. Use your dye marker to make an arrow, circle or other design on the sand to facilitate sighting by the SAR team.

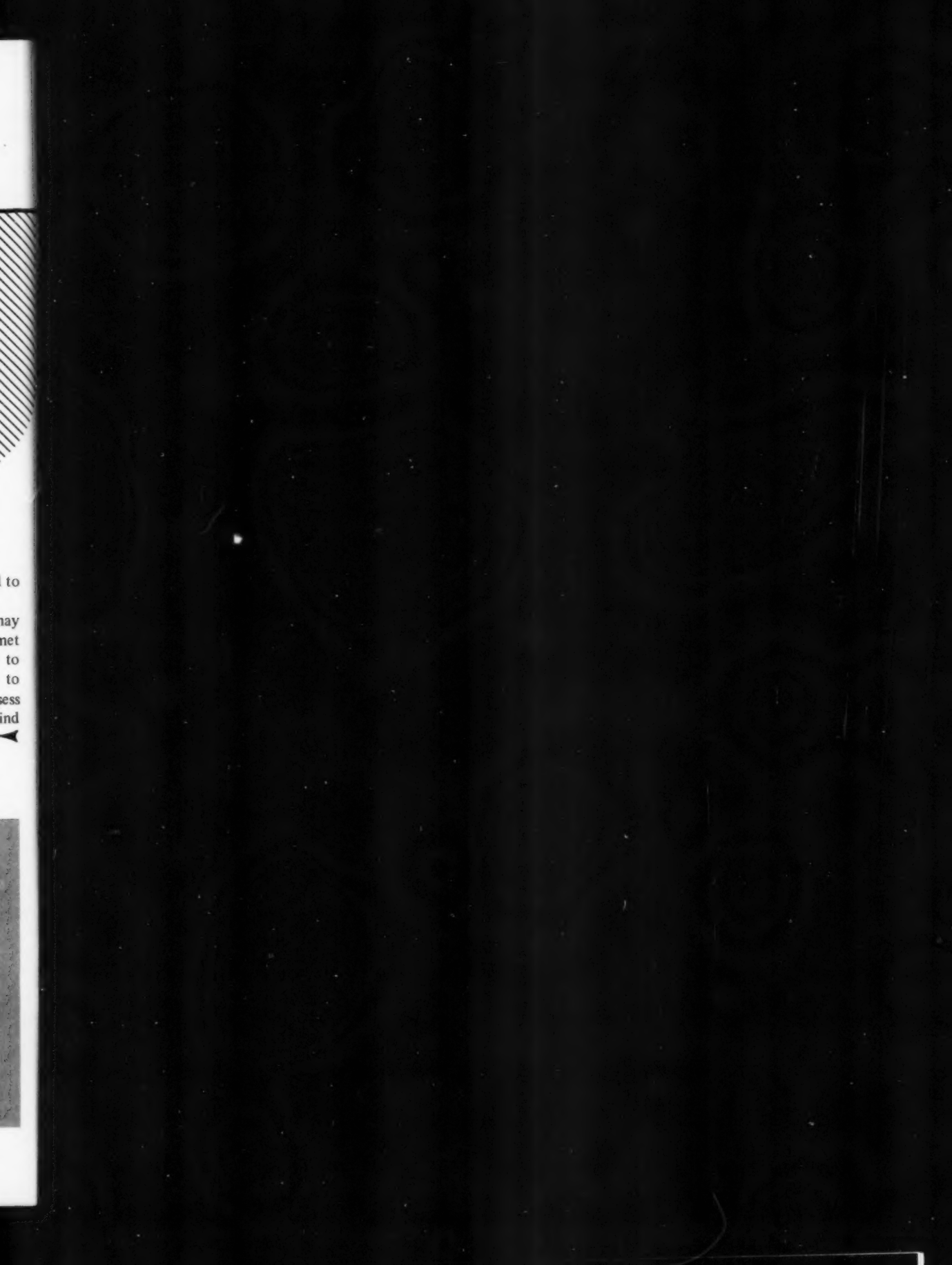
There are no constants in survival. All situations may have similarities but all are different and must be met and coped with on an individual basis. In order to survive until rescued, you must have the ability to improvise and adapt the knowledge you already possess to the particular "difficult situation" in which you find yourself.

Good Grief

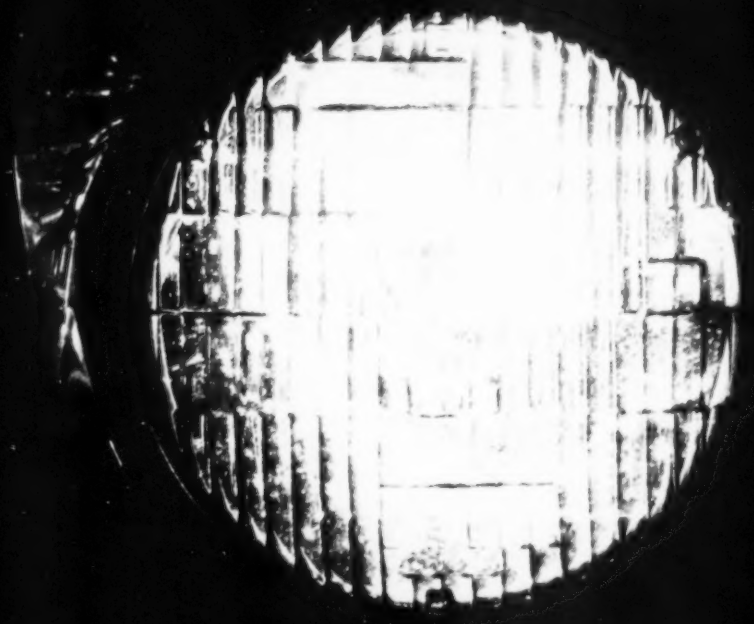
AN SH-3D landed aboard a CVS at 0430 and after shutting down it was found that the rotor blades could not be folded. A hydraulic jenny with appropriate fittings was not available. This necessitated leaving the blades spread. About six hours later, after the helo had been towed forward and parked on the port side with the blades extending over the deck edge, some high, gust winds severed one blade, bent another and damaged three others.

Almost In The Drink

THE CH-46 was delivering the 16th load of provisions to the LPH and as the pilot lowered the load his rear rotor blades contacted an antenna. He dropped his load and cleared the area quickly. The vertrep drop zone was on spot No. 4, alongside the island, which does not allow any tolerance for lineup deviation that would allow the tail to swing toward the island.



HEADLIGHT GLARE



THE fact that night highway fatality rates are higher than day rates is largely due to the problem of headlight glare.

Drivers put too much trust in their own headlights. The finest headlights depreciate rapidly — often lose 60 percent of their effectiveness — if they are not kept clean and in perfect focus.

Drivers also forget how the human eye is handicapped. In darkness, the pupil expands to admit all light possible. When a brilliant headlight beam strikes that wide-open pupil, it is painfully dazzled and contracts rapidly.

The pupil contracts, however, about 60 times faster than it can expand. When glaring headlights have passed, a curtain of blackness hangs on that leaves one almost blind.

During that blind interval, if you are driving 40 miles an hour, your car will travel about 200 feet.

In the face of glare, many drivers watch the right-hand margin of the roadway, but even this limits their range of vision. Two other precautions should be taken:

- Be sure you have lowered or dimmed your own headlights; the other driver should do the same.
- Whether or not he lowers his headlights, reduce your speed until the effects of the glare have passed.

Cool It!

"IT'S not the heat – it's the humidity!"

How many times have you said or heard somebody say that?

When you're in a hot climate, your comfort depends on whether or not you can maintain your so-called thermal balance. You do this by getting rid of heat at the same rate you acquire and produce it. When you can breathe off and sweat off heat as fast as you take it on from various sources, you are in thermal balance. If increased humidity prevents evaporation of sweat or the thermometer reading soars, you can get out of balance.

In naval aviation, when it comes to heat, calendars don't count – geography does. Depending on where you are, heat can be an aggravating problem for ground and flight crews at any time of year. Heat is a fact of life aboard ship and at bases in tropic and subtropic areas. Even aboard ship and ashore in the temperate zones, heat can be a real headache. And peculiar to military aviation is the situation of the pilot and crew, suited up and strapped in, awaiting launch, surrounded by heat-reflecting surfaces and topped by a canopy which seems to concentrate the sun's rays like a magnifying glass.

Heat illness is a very real possibility.

There are two major kinds of heat illness – heatstroke, which is a medical emergency, and heat exhaustion. Your flight surgeon can brief you on the symptoms and treatment of heatstroke. Since you are more likely to encounter cases of heat exhaustion, let's take a quick look at this less serious kind of heat illness.

Heat exhaustion occurs when you lose a great deal of water and salt. Typical signs and symptoms are profuse perspiration, pale cool skin and a drop in blood pressure. Subjective symptoms include headache, mental confusion,

Safe Boating Is No Accident

WOULD you believe some 42 million Americans went boating last summer? We're not talking about Navy launches and riverine craft here – we're talking about recreational boating.

Nobody knows how many boating accidents and injuries there were nationally, but for good reason, National Safe Boating Week begins the last of June.

Common sense and good manners are basics in safe boating. Here are eight simple tips from the American Red Cross which summarize the situation:

1. Be sure that weak swimmers or nonswimmers wear Coast Guard-approved lifejackets or approved lifesaving devices.

2. Whether your boat is powered by sail, outboard or inboard motor, equip it with such safety equipment as a lifejacket or approved lifesaving device for every passenger, an anchor, oars, bailing can, boathook, extra line, fire extinguisher, tool kit and first aid kit. Running lights are a must for operation at night.

3. Don't overload. Keep your passengers down to a safe number. Don't let passengers stand up in a small boat. If it's absolutely necessary for you to change seats, keep low.

4. Don't overpower your boat. Your dealer can tell you the safe size motor for it.

5. Check the weather bureau forecasts before you take your boat on open water. Take a transistor radio along to keep posted on weather developments.

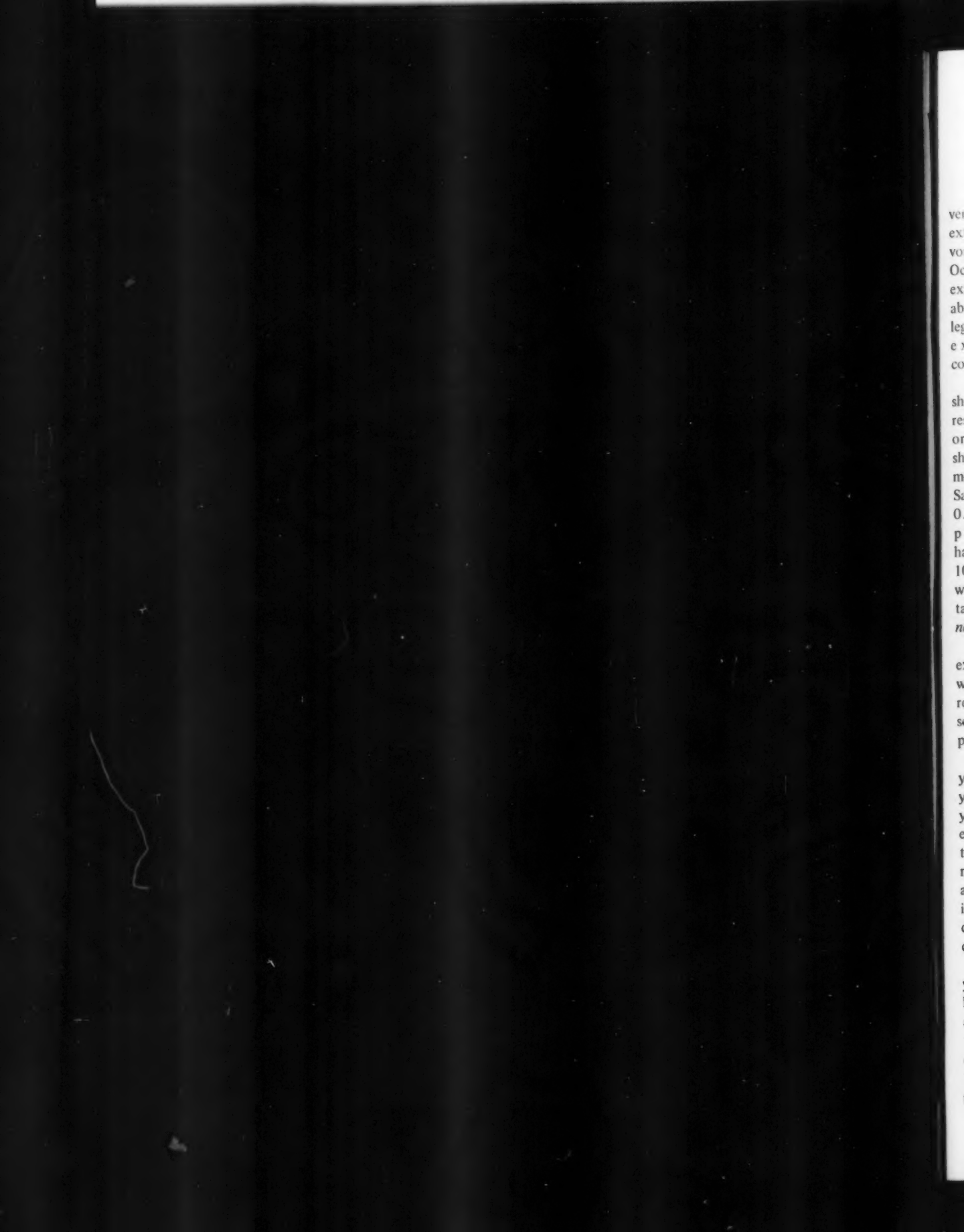
6. Don't smoke while refueling.

7. If you're out in bad weather, wear a lifejacket.

8. Stay with your boat if it capsizes – it will usually float even though filled with water. Exceptions are if the boat is in heavy surf or dangerously near a waterfall or dam or if the water is very cold. Put on lifejackets before attempting to swim to safety.

We might add here two more safety tips to the Red Cross list: 1) Drinking and safe boating don't mix and 2) Let someone know where you're going and when you plan to return.

Boatmen should be prepared for the unexpected. If an emergency occurs, think – don't panic – and take the action necessary.



notes from your flight surgeon

vertigo, incoordination, drowsiness, extreme weakness, loss of appetite, vomiting and visual disturbances. Occasionally, a person with heat exhaustion has cramps of the abdominal muscles or of the arm or leg muscles. The victim of heat exhaustion rarely loses consciousness.

A person with heat exhaustion should be taken to a cool place to rest. Elevating his feet and moving or massaging his legs are helpful. He should be given saline solution by mouth as freely as he will take it. Saline solution in the recommended 0.1 percent strength can be prepared by adding a half-teaspoonful of table salt or two 10-grain salt tablets to a canteen of water. If water is not available, salt tablets or salt in other forms should *not* be administered.

The mortality rate from heat exhaustion is extremely low and, as we said above, a cool environment, rest and the administration of salt solution will, as a rule, result in prompt recovery.

Generally speaking, what can you do for yourself to maintain your resistance to heat illness? Well, you can't do much about the environmental factors of air temperature, humidity, air movement and heat radiation or about your lack of acclimatization if you've just flown in but you *can* do something about your physical condition.

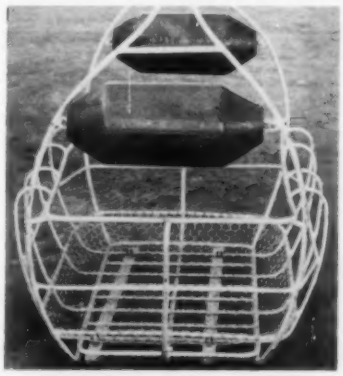
Good physical condition makes you more resistant to heat illness. Factors which *reduce* a person's ability to withstand high temperatures include: dehydration, excessive consumption of alcohol, lack of sleep and cumulative fatigue. Obesity increases the heat load carried and decreases heat transfer from deep body sites to the skin. Accumulated body heat storage due to lack of adequate recovery periods also affects resistance to heat illness so take a break now and then and "cool it."

Your medical personnel are your best source of guidance on how to cope with heat. In summary, you should drink plenty of water and fruit juices and go easy on the booze; salt your food and take supplemental salt tablets if your flight surgeon recommends them; get enough rest; and keep in good shape.

If you are exhausted from the heat, you can make those little mistakes which are so unforgiving in aviation.

Take care of yourself – it's going to be a long, hot summer.

"Homemade Baby Carriage"



This is the standard Coast Guard rescue basket. You may never have occasion to use it but it might someday be your means of rescue so take a good look.

"A HOMEMADE baby carriage" was the way an F-4 pilot and RIO described the rescue device used by a Coast Guard helicopter to pick them up from the water after ejection.

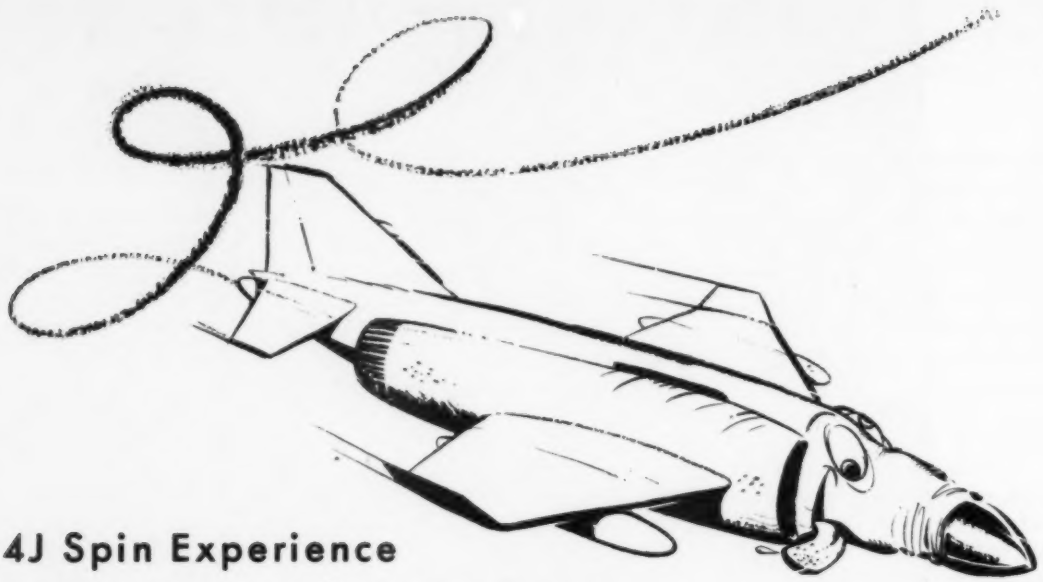
The two men said the basket-like device was different from anything they had ever seen before. Both had trouble getting into it. The pilot reported that while climbing in he hit his head repeatedly against the metal frame. He would have sustained serious head injuries if he had not been wearing his helmet, he said.

The device used was the standard Coast Guard rescue basket (see photo). The basket is 40 inches long, 40 inches high and 24 inches wide. It is proof-tested for a 600-pound load, evenly distributed, and is designed to carry one person at a time although in extremis it will hold two. The basket is made of steel tubing and has a foam-filled flotation cylinder at each end bearing the admonition, "Remain Seated."

The Coast Guard advises that there is no particular recommended method of boarding the rescue basket.

Hardhat Protects

A CREWMAN aboard a helicopter which had to be ditched at sea unbuckled his seatbelt and, although he had trouble getting by the mounted machine gun, exited through the right cargo door. Sometime during his escape he lost his hardhat. Recovered after the rescue, the hardhat showed evidence of a sharp, heavy blow which had broken the cover of both visors, the shell and the foam lining. There was another six-inch crack in the shell on the right side. *Thanks to the helmet protection the crewman sustained no head injuries.*



F-4J Spin Experience

DURING a missile intercept hop the pilot was making a visual reattack. His aircraft was at military power, at an altitude of 28,000 feet, mach .88, and in a nose-up attitude with about 45 to 60 degrees angle of bank. The pilot was in about a 4G turn with his attention on the bogey aircraft (he was not watching the angle-of-attack). The aircraft suddenly departed with a violent nose-down movement, throwing both crewmembers against the right side of the aircraft.

The *Phantom* then entered a spin with the turn needle pegged to the right. The angle-of-attack was not observed by the pilot. The RIO recalled that he thought they were in a left-hand turn as determined by outside references (it was daytime, VFR and over water). Both crewmembers estimated a total of four complete revolutions were made before recovery was completed.

The pilot stated that he went to neutral stick during the departure, reduced power and then went to forward stick after about two revolutions of the aircraft. He then notified the RIO that the aircraft was not recovering and the RIO at that time called for the drag chute. The pilot quickly responded and deployed the drag chute. The spin was immediately broken. The aircraft was in a steep nose-down attitude and after two more minor oscillations the pilot recovered the aircraft at an airspeed of about 250 to 300 kias and at an altitude of about 15,000 feet.

The pilot commented later that he felt he had induced a departure by having stick into the turn during the high-G reattack and that he was late in applying forward stick, i.e., not until the spin had developed. Further, he stated that he did not note the angle-of-attack and because both crewmembers noted negative G during the spin it may have been inverted. This may have confused the RIO in judging the direction of the turn or the negative G may have been due to the forward stick being applied.

Anymouse

The pilot's analysis of this event seems like a good one to us. For further reading on F-4 poststall gyrations, see the article on page 5 of the December 1970 APPROACH.

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT, PREVENT AN ACCIDENT

ATC and Radar Weather Advisories

WHILE returning to NAS West Coast from a cross-country training flight, we encountered severe turbulence and sustained hail damage to engine nacelles, radome and leading edge wing slats of our KA-3B. As we were proceeding westbound over Aberdeen, Kansas, at FL 220 under radar control of Minneapolis Center, we noted several buildups to the north.

Shortly thereafter we entered what appeared to be a stratified cirrus layer where we encountered light turbulence and exceptional St. Elmo's fire. Visibility was less than three miles. After entering the first CB at FL 220 we requested a climb to attempt to top the storm. Clearance was given to FL 260 and after we leveled off we hit severe hail estimated to be 1 to 1½ inches in diameter. We broke out into relatively clear air and informed Minneapolis of the CBs. They replied that their radar was tuned to eliminate CBs and this was the first that they had heard of the storms.

It is important to realize that aircraft in positive control areas are controlled only by secondary radar which exclusively paints beacon targets only. Thus the controller may not be aware of any weather activity unless advised of the situation by the pilot.

Suggest that 1) pilots make better use of flight service station and metro while airborne and 2) weather stations report significant weather to centers for more complete advisory service to airborne aircraft.

Wiser Mouse

Well said! We will wager that you are a wiser weather mouse indeed! When the possibility of CBs exist, the best flight altitude for above the freezing level penetration is one which gives maximum clearance of the freezing level while remaining within the prescribed flight envelope of the aircraft. For a further discussion on the subject of weather advisories by FAA see "Severe Weather Avoidance" on page 8 of the April 1970 issue of APPROACH.

"Somewhat Bored"

A SINGLE A-4E was returning home from a successful close air support mission. The aircraft was proceeding VFR at 17,500 feet, on autopilot. The pilot, a combat-seasoned LCDR with 2500 hours flight time, over 1200 of which was accumulated in the *Skyhawk*, became somewhat bored during the 30-minute flight and decided to pass the time checking out the aircraft's radar, navigation set and any other equipment he could think of which had not been used frequently. The search for things to do ended back at the spare light bulb locker. Upon looking up after a few seconds with his head tucked down under his right arm, he was amazed to find himself inverted in a 70 degree dive, passing through 12,000 MSL. The terrain elevation under the aircraft was close to sea level and an uneventful recovery was made. However, about 30 miles ahead, the terrain rose to over 13,000 MSL. Had the pilot experienced this AFCS disconnect with his head in the cockpit a little further along the route . . .

A-4E Mouse

We have no idea what caused the AFCS disconnect. This would certainly be a problem for the squadron maintenance men to look into; however, the big point here is the hazard of becoming bored and burying your head in the cockpit. In this case, it could have resulted in a collision with the terrain had circumstances been only slightly different. Another thought is, it could easily have resulted in a mid-air collision. No matter how bored you may become, resist the inclination to let down your guard – and keep that head on a swivel.

A Wing and a Prayer

At release point it became obvious to the Phantom pilot that his ordnance had not released correctly when his aircraft entered a sharp right wing down attitude. The pilot was not unprepared for this occurrence because he was part of a small group who had received a thorough briefing from another squadron pilot confronted with the same situation in the same aircraft two days earlier. Unfortunately, things didn't turn out for him as they had for the other pilot and, as a result, he and his RIO were forced to eject when he was unable to keep the right wing from dropping just prior to touchdown. We are happy to report that there were no injuries; however, the aircraft sustained strike damage. There is much to be learned from this mishap involving an asymmetrical wing load because many contributing factors were involved. Pilots and maintenance personnel whose aircraft carry wing-mounted external stores should give the below article their complete attention. It could help to prevent a recurrence of this type of mishap.

IT was a beautiful day at an air base in RVN when two F-4B crews assembled to commence briefing for a combat mission. A thin layer of clouds was discernible at 25,000 feet and visibility was in excess of seven miles. A thorough briefing was conducted by the flight leader, a young but highly capable pilot. He informed the crews that when over the target area they would be controlled by a FACA (forward air controller, airborne). He then described the bomb load each aircraft would carry. The lead aircraft was configured with MERs mounted on the centerline and both outboard wing stations and a TER mounted on both inboard wing stations. The aircraft would carry 18 Mk-82 LDGP bombs; six on each of the wing-mounted MERs and three on each TER. The centerline MER was left empty due to maximum gross weight considerations. Because the aircraft had to rely solely on internal fuel in this high drag configuration it was assigned only to qualified section leaders. The wingman's aircraft was configured with a 370-gallon external fuel tank mounted on each of the outboard wing stations, a TER mounted on each of the inboard wing stations and a MER mounted on the centerline. It was loaded with 12 Mk-82 LDGP bombs; three on each TER and six on the MER.

Preflight, start, taxi, takeoff and rendezvous went smoothly and the flight to the target area was routine. The flight checked in with the airborne FAC who gave a target brief and requested that each aircraft drop two bombs on the first run. The flight leader stated that he would rather drop 12 bombs on his first run and have his wingman drop six on his first pass. The airborne controller did not consider this to be an emergency or a high priority target so the suggested drop sequence was accepted. As briefed the flight leader commenced a 30-degree dive, 500 knots, 4000 feet AGL attack run on the target. He selected the ripple/outboard mode for the

The flight leader decided to make a second attack and attempt to release the remaining bombs from the aircraft. To prevent an excessive G load and another unusual recovery he planned to make this run at a more shallow dive angle.

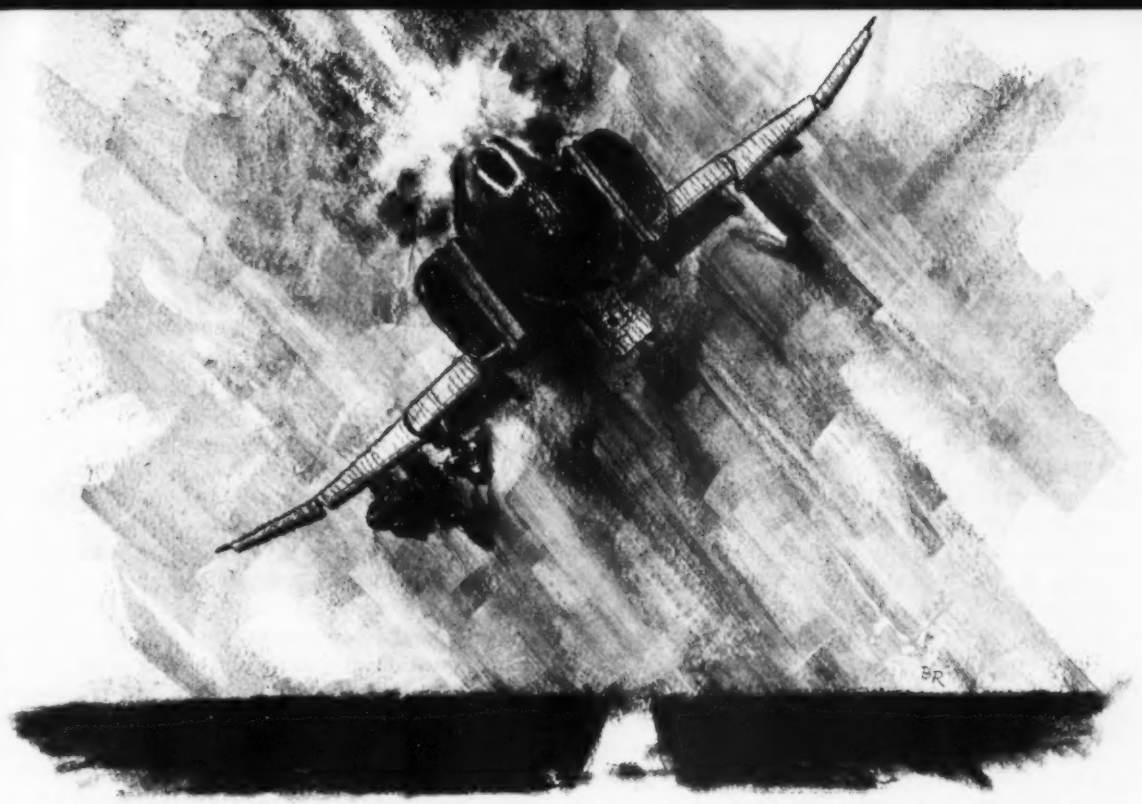
drop, expecting to release the six bombs from each of his wing-mounted MERs. At release point it became obvious to the pilot that only the left outboard MER had released its bombs when his aircraft entered a sharp right wing down attitude. Even though pulloff from the target was executed to the left, recovery from the unusual attack run was made without incident. The wingman then went in on his first attack run and dropped six bombs on the target. The flight leader decided to make a second attack run and attempt to release the remaining bombs from the aircraft. To prevent an excessive G load and another unusual recovery he planned to make this run at a more shallow dive angle. The airborne controller was notified of the pilot's intentions and clearance was given. The run was made in a 10-degree dive at 500 knots with release to begin at 2400 feet AGL. Ripple/all was selected as the release mode. When the pilot pickled, only the bombs on the left inboard TER dropped from the *Phantom*. The wingman made his second run and dropped his remaining six bombs on target. The flight leader then decided to make one last attempt to drop as many bombs from the aircraft as possible. Clearance was obtained from the airborne FAC and the pairs/outboard mode of release was selected. The run was fruitless; no bombs left the aircraft.

The flight leader felt he'd had it over the target area so he bade farewell to the controller and he and his wingman departed for the jettison area. Enroute the wingman confirmed the suspicion that nine bombs remained attached to the right wing, six on the outboard MER and three on the inboard TER. Using various modes during several release attempts resulted in the release of the MER and TER on the left wing and the MER on the centerline. The right wing MER and TER and their bombs remained attached to the aircraft.

The flight leader and his wingman began a return to home base. He tried to contact his squadron on UHF base frequency to request possible suggestions for proper approach and landing procedures, but was unable to raise anyone. He made no attempt to contact the group ODO on base frequency for suggestions, primarily because of the pressure placed on him by the aircraft asymmetrical condition now complicated by a relatively low fuel state. As has been stated earlier, he had received a very thorough briefing the day before on an asymmetrical condition when in a landing configuration. This briefing no doubt created a feeling of confidence that the situation could be salvaged without incident.

Approximately 20 miles from the base, the flight leader sent his wingman ahead for landing. At the same time he notified the base tower that he would be making a straight-in approach with hung ordnance to the duty runway which was 14. Some confusion existed, but apparently the tower called the winds from 120 degrees at six knots. (Actually the wind was from 070 degrees at nine knots.) The flight leader requested the tower to have a crash crew standing by just in case something went wrong. He slowed the aircraft, lowered the landing gear and extended full flaps. He then maneuvered the aircraft to try and determine the minimum controllable airspeed for the approach. The pilot found that the right wing would begin to drop below 176 knots and set this as his minimum. He started a shallow, low rate of descent approach at 180 knots. When five miles from the approach end of runway 14, he called the tower and reported his landing gear and flaps down and his landing light on. The entire approach was flown with full left wing down trim, nearly full stick displacement to the left and almost full left rudder displacement. The pilot also used about 10 to 25 percent more RPM on the right engine than the left during the approach to take advantage of the asymmetrical thrust. As the F-4 crossed the runway threshold, full left rudder and stick were required to keep the wings level. At between 10 and 30 feet of altitude the aircraft commenced to roll to the right. Full military power from the right engine and a positive forward stick movement failed to correct the roll, in fact it became more rapid. This did it for the pilot. He immediately told the RIO to eject and at the same time used his left hand to pull the alternate ejection handle. The RIO had not selected command eject prior to initiating his own ejection using the alternate ejection handle. Both crewmembers left the aircraft safely with the *Phantom* in a 30 to 45 degree right bank.

The AAB (Aircraft Accident Board) discovered several factors which provided a significiant contribution to the conditions which resulted in this accident. An insight into each of these factors was gained from investigation of the aircraft wreckage, inspection of and investigation into the operation of various recovered parts, comprehensive examination of maintenance records and perusal of the statements made by the pilot,



RIO and several witnesses to events involved in the accident sequence. These points are detailed below:

• The extreme asymmetric condition of the aircraft, which was obviously outside the recommended limits for landing, forced the pilot to choose one of two alternatives. He could eject out over the ocean or he could attempt an approach with an aircraft which had marginal controllability. To decide on either course of action without suggestions from a higher, more knowledgeable source of information is extremely difficult, for neither alternative offers a positive solution to the problem. Faced with this weighty decision, the pilot attempted to contact his squadron via the UHF base frequency. He was unable to do so because the radio had been disconnected and moved along with maintenance control, who maintained a UHF watch, to a new section of the hangar. *(Nowhere in the AAR is there any mention of why the pilot did not know the squadron UHF radio was to be moved. – Ed.)* He did not choose to contact the group ODO on his base frequency for reasons which may or may not have been at the forefront of his conscious thoughts. He had made one attempt to get help which ended in failure and at that time he was about 20 miles from the base with only 3500 pounds of fuel remaining and a heavy, difficult-to-control aircraft on his hands. The lieutenant made the decision to attempt an approach without guidance from anyone on the ground or from the usually helpful NATOPS guide. He made it because the situation called for an immediate action of some sort and a rapid decision was mandatory. In his failure to attempt contacting the group ODO prior to making the decision to go ahead with an approach, the judgment of the pilot can be faulted. The extent to which this failure can be considered a factor contributing to the accident would be conjecture. By contacting the group ODO, the pilot may have been able to gain information which would have assisted him in making his decision. However, the only information which could have been of real importance to him was accurate wind information. Pilot techniques for the approach could have been reviewed for him, but these were relatively fresh in his mind from his very recent briefing on the situation.

• The cartridge assembly for the explosive bolt in the right inboard wing pylon was missing from the aircraft. This was discovered after the accident when the pylon was recovered from the wreckage and inspected. The cartridge assembly and explosive bolt are designed to separate the inboard wing pylon from the aircraft when initiated. The electrical system which initiates the cartridge is completely independent of the weapons release system. It is essentially a direct connection

The aircraft was due to enter its first check cycle with the squadron three weeks from the date the accident occurred.

between the armament bus and the cartridge. Without this cartridge assembly in place, there is no method for jettisoning an inboard wing pylon. That's why nothing left the aircraft when the pilot attempted to jettison the right inboard pylon using the missile status panel. A squadron policy requires the ordnance section to physically check both the cartridge assemblies and explosive bolt housings in each of the inboard wing pylons when an aircraft is initially accepted by the squadron, whenever the pylons are removed from or replaced on the aircraft and during each aircraft check cycle. It was verified that an acceptance check was performed on the aircraft four months prior to the accident. However, nowhere in maintenance records is there any indication that the cartridge assemblies or explosive bolts were inspected. Furthermore, since the acceptance check, there was no indication that either of the assemblies or bolts were removed from the aircraft. The aircraft was due to enter its first check cycle with the squadron three weeks from the date the accident occurred. Since the cartridge assembly was missing from the aircraft, it must be assumed that either the cartridge assemblies and explosive bolts were never inspected during the acceptance check or some unknown person failed to replace the missing cartridge.

• NATOPS recommends 379,000 lb inches of torque as the limit for an asymmetrical approach to landing. With the nine Mk-82 bombs hung from the right wing MER and TER, the aircraft had an asymmetrical torque of 619,000 lb inches during its approach. If the pilot had been able to jettison his right inboard pylon with its TER and three bombs, the torque applied to the right wing would have been reduced by 152,000 lb inches. This would have left the aircraft only 88,000 lb inches above the maximum recommended by NATOPS and would have allowed the pilot more controllability of his aircraft. With this reduction in torque, it is quite possible that the pilot would have had enough control effectiveness to overcome the last instant rolling attitude and land the aircraft successfully. Therefore, since maintenance personnel and their supervisors were responsible for assuring that the cartridge assembly was in place in the right inboard wing pylon it can be said that inadequate maintenance contributed significantly to the conditions resulting in this accident.

• Air base weather service stated that the winds at the time of the accident were from 070 degrees at a relatively steady nine knots. Witnesses to the accident corroborated the weather service report stating that the winds seemed to be from the east blowing directly across the runway. The flight leader was sure that the air base controller had given the winds from 120 degrees at a steady six knots. The tape recording of UHF radio transmissions to and from the base was so garbled and unreadable that it could not be determined what winds were given. However, if the pilot thought the winds were from 120 degrees, he would have expected a relatively small amount of crosswind which should cause little or no trouble during the approach and after touchdown. The unusual configuration of the aircraft and the extreme control positions necessary for level flight may have prevented him from realizing that the winds formed a more severe crosswind component than he expected. Under the stress of the moment, such indications might not have registered anyway. To keep the aircraft on course in a wings-level attitude during the approach, the pilot had committed himself to the use of nearly full left control deflection. An upward fluctuation in the wind velocity of one to five knots as he approached touchdown would have been enough to initiate the right roll. Small fluctuations in wind are normal for the most steady of winds and could have existed in this situation. There is insufficient proof to verify that inaccurate wind direction was given the pilot, however, the crosswind was an environmental factor in that it contributed significantly to the accident.

• Had the flight leader been able to jettison the outboard MER with its six bombs from the right wing, his problems would have been reduced to clearly manageable proportions. This would have reduced asymmetrical torque by some 467,000 lb inches which is well within the limits recommended by NATOPS. The F-4B has an emergency wing stores jettison system which allows the pilot to jettison the two outboard wing pylons and everything attached by selecting the jettison position on the external tanks jettison switch. This system is supposed to be completely independent of the normal weapon release system which also connects with the outboard wing pylons. Unfortunately both systems join in the same cannon plug leading out of the aircraft at a single point at the outboard stations. This cannon plug is connected to the pylon by a single connection referred to as the pylon disconnect which when connected locks the plug in place. By virtue of this single

electrical connection for two supposedly independent electrical systems, the emergency jettison system has been made dependent upon the weapons release system and vice versa, with both systems dependent on the reliability of the pylon disconnect. Two days prior to the accident, the pylon disconnect in the right outboard wing pylon of the same aircraft had become disconnected, preventing release of any of the bombs loaded on the MER attached to that pylon. No jettison attempt was made, but since there were no electrical connections to the pylon it is reasonable to assume that the pylon could not have been jettisoned. It is probable that the same thing happened on the flight terminating with the accident, thus denying the pilot the opportunity to release bombs from the MER or jettison the pylon. Routing of the normal ordnance release and emergency wing stores jettison circuits through a common connector makes design a contributing cause factor to this accident.

In summary, there were five factors which contributed to this mishap.

- Squadron level supervisory – maintenance – failure to correct repeated ordnance discrepancies. This was listed as the primary cause of the accident.
- Maintenance – failure to check and install cartridge assembly for explosive bolt.
- Material failure – relays in multiple weapons panel.
- Design – routing of the normal ordnance release and emergency wing stores jettison circuits through a common connector.
- Crosswind – environmental.

There were many interesting comments made by endorsers to this aircraft accident report. Those considered most pertinent are discussed below:

- The pilot involved in this mishap is an extremely capable individual. He was designated a combat section leader because of the mature judgment, stability and aeronautical skills he displayed. He was faced with an extreme situation for which there is no *book* solution. When he was unable to gain assistance from the usually available squadron radio, he made no further attempts to seek help from anyone on the ground. This led him to several courses of action which might otherwise have been handled differently. This is of course hindsight and is therefore speculative. Had he been cognizant of the fact that there was a left crosswind factor of 70 degrees at nine knots, he may well have chosen another course. The positioning of an LSO on the runway could have provided invaluable assistance by advising him of the half-flap configuration recommended by NATOPS. (It should be noted that the inflight guide does not provide this information and the pilot with whom he had discussed a similar recovery had used full flaps.) The fact is he had none of this information or assistance given to him.
- An expansion of NATOPS emergency procedures for an aircraft landing with an asymmetrical load is indicated. While it is realized that NATOPS cannot provide a solution to every emergency situation, it is evident that a requirement exists for more specific information and guidelines pertaining to aircraft configuration, controllability and maximum safe airspeed during the approach and at touchdown.
- This pilot was part of a small bull-session that discussed corrective action for the asymmetrical landing situation with another squadron pilot who had a parallel, but successful, experience two days prior and in the same aircraft. Discussion of this incident at an AOM with all the best experience in the squadron would have helped him put the best procedures for handling his emergency in proper order. Maintaining adequate airspeed in the final approach was his primary requirement.

It is readily apparent from all that has been brought forth in this AAR that enough information concerning asymmetrical loads is not presently available. All aircraft which carry wing-mounted external stores are subject to being placed in an asymmetrical loading situation. With this in mind, it behooves all operators to reevaluate their NATOPS as it applies to this condition. If it does not give a pilot sufficient information pertaining to proper procedures to use when confronted with an asymmetrical load, in any configuration, then action should be taken to gain this information as soon as possible. It could help to save a life and an aircraft. ◄

South Africa natives who beat drums to scare off evil spirits are laughed at by American motorists who honk horns to break up traffic jams.

Safety Review

LETTERS

Worry is like a rocking chair, it gives you something to do but gets you nowhere.
Ace L.

Fuel Phraseology

NAS Dallas, Tex. – We have a difference of opinion here at NAS Dallas. The topic involves the difference between the terminology "minimum fuel" and "low state." It is my contention, and most of the other controllers agree, that when a pilot declares "low state," it is automatically assumed that the pilot is actually looking at the fuel warning light and an emergency exists, which if not declared by the pilot, should be declared by the controller. The aircraft should then receive emergency handling. We have had instances where a pilot (after receiving a go-around) has stated that "I have low state" and then proceeded to shoot a touch-and-go landing. I believe that many times "low state" is used when "minimum fuel" is actually meant. OPNAVINST 3710.7E and ATP 7110.8 give the definition of "minimum fuel" but make no mention of "low state" (that I have found). Seems to me that "low state" used to be spelled out but I have yet to find it in any of the ATC publications. Should the controller be required to ask the pilot if he is declaring an emergency when he declares "low state," or should it be assumed that "low state" constitutes an immediate action emergency and handle the aircraft as such?

I may have missed the boat somewhere but if so, I am not alone and do feel that this is a serious misunderstanding that could result in a serious accident eventually.

ACCS B. M. Hanks

● As far as we are able to determine, the term "low state" has no official standing; *however,* there is no doubt that it is sometimes used even though its exact meaning may vary from person to person and from situation to situation. It appears to be a poor term to use in the control of air traffic and we believe its use should be positively discouraged. The term "minimum fuel," on the other hand, does have *both an exact meaning and official standing.* It is defined in OPNAVINST 3710.7E as follows:

"Minimum fuel is an advisory term indicating that, in the judgment of the pilot, his fuel state is such that upon reaching his destination no undue delay can be accepted. This is not an emergency situation but undue delay may result in an emergency. If at any time the remaining usable fuel supply suggests the need for traffic priority to ensure a safe landing, the pilot shall declare an emergency."

It is strongly recommended that both pilots and air controllers use the official term "minimum fuel" when appropriate rather than less definite and unofficial terms such as "low state." However, if you do run across the term "low state" while in the process of controlling an aircraft, we can only suggest that you attempt to get clarification from the pilot or, if this is not feasible, that you treat it as a potential "minimum fuel" situation. This does not mean that unnecessary priority should be given, but rather that decisions as to courses of action must be made dependent on the existing pattern traffic, weather, etc.

Put The Pins In (More)

NAS Atlanta, Marietta, Ga. – Retract your retraction! In the December issue of APPROACH you confessed to a goof in the August 1970 issue concerning A-4 safety pins. The *(new)* A-4B/C/L NATOPS Flight Manual on page 3-17 includes "Ejection seat and canopy safety pins installed" as an item of the pilot's postlanding checklist.

Recommend 30 lashes with a wet noodle for CDR Kowalskey for insinuating that NAVSAFECEN unduly chastises us pilots.

LCDR M. E. Feltham, USNR
VA-205

● To be truthful about it, having already taken our lumps, when the article was written for the August issue the latest NATOPS Flight Manual to which you refer had not hit the street. It is official now for the A-4B/C/L series and it might be included (one of these days) in the A-4E/F and TA-4 series too.

Flight Deck Safety

FPO, San Francisco, Calif. – For many years I have observed many safety rules being violated in pictures taken on the flight decks of our aircraft carriers and printed in your magazine without any comment from you. This one I could not pass up as it is so obvious to anyone who has worked on a flight deck. On page 29 of the January 1971 APPROACH there is a picture of an aircraft ready to touch down (see photo). In the foreground is a man with his back to the incoming aircraft. He is walking forward, seemingly unconcerned about the rule, "Never put your back to a landing aircraft." Also, if you look closely, you will see a total of eight personnel standing between No. 3 and No. 4 elevators completely unprotected from the arc of the arresting gear cable should it part. What has happened to the "No unauthorized personnel allowed aft of the island during recovery?" I can't believe eight people were authorized on deck aft of the island on the ship in the picture.

CWO G. C. Mergier
USS TICONDEROGA (CVS-14)

● If you look closely at the photograph you will see that the four F-4s in the foreground are manned by pilots and RIOs. Thus, it appears that they are being readied for launch, requiring

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

FLIP Changes

THE Department of Air Force, Headquarters Aeronautical Chart and Information Center, St. Louis, Missouri has notified the Naval Safety Center of the following changes to FLIP documents:

• *Daylight Saving Time:* Daylight saving time will be in effect from 0200, local standard time, 25 April until 0200, local daylight time, 31 October 1971, in the coterminous United States, except Arizona and Michigan.

plane captains and appropriate flight deck personnel. We heartily agree with you that no unauthorized personnel should be aft of the island during recoveries but in this case, at least, it appears that these personnel are engaged in readying the F-4s for launch and are "authorized." However, "authorized" or not, there are abundant statistics on file at the Naval Safety Center to show that it is very hazardous for personnel to be positioned within the potential arc of an arresting gear cable if it should part.

Shipboard supervisors must always keep this in mind in authorizing personnel on deck during landings. Also, personnel required on deck must be educated to the urgency of using protective cover whenever and wherever it is available (flight deck equipment such as support equipment, crash crane, etc.). Finally, personnel must act on flight deck safety knowledge and certainly, never turn their backs on aircraft about to arrest.

Photographic evidence of unsafe acts or conditions does serve to stimulate much profitable discussion and, hopefully, self-analysis. Space does not permit us such analysis.

Your concern for flight deck safety is well-taken. All hands must use great care to avoid the many hazards which can trap the unwary or careless man on the flight deck.

Compass

FPO, San Francisco – In reference to CAPT A. W. Massey's letter concerning the wrist compass in the March 1970 APPROACH, I have found that this compass can be ordered separately. The watch style pocket directional compass is found in the GSA Stock Catalog, Part 2, page 3. The stock number is FSN 6605-177-5283 and the price is $1.40 each.

Most pilots in RVN are issued government type watches which are made of plastic or aluminum. Neither of these substances has any effect on the magnetic capabilities of the compass.

SGT Robert L. Hall, USMC
VA-211, FMFPac

• Thanks for your information. This should save a lot of people a lot of nomenclature and stock number-hunting time!

APPROACH welcomes aboard VMA-513 and the *Harrier* aircraft. We invite our readers to look for an article next month concerning ground support, handling and other safety aspects in the operation of this new and excitingly different aircraft. – Ed.

Take APPROACH along for a safe summer.

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Vol. 16 **approach** No. 12

RADM W. N. Leonard
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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Credits

This month the Navy unveils its newest in the form of the British-built Hawker Siddeley *Harrier*. Cover artist Blake Rader depicts the *Harrier* in battle dress and shows one of the advantages of the vertical takeoff and landing. Pg 20 Old Print courtesy The Chrysler Museum at Norfolk, Pg 33-34 APPROACH diagrams by Don Lips, Pg 35 APPROACH photo by PH3 Charles Norden.

A FABLE

A GROUP of birds decided to form a safety program. So they called a meeting and the duck stood up and said, "I think we should have a lot of safety meetings. It's another way we can get together with the flock and bawl them out."

But the rooster said, "No, that takes too much time and we've got to get the pigs in the ground." So the argument went on. The parrot said, "We don't need any meetings. Everyone will be safe because they know it's the right thing to do."

All the birds cheered, for they knew that no one tries to get hurt on purpose. Then the mockingbird said, "What we need are a lot of posters. We will put posters up all over the place and we'll have safety." The thrush said, "We don't want posters," and the sparrows said they would do just as well if they had some slides. The goose stood up and said, "What we really need is a safety director who'll be stern." But the starling thought it was more important that the safetyman be a "good mixer." The bluejay figured if the safety director laid off the safety inspection he'd automatically be popular with everyone.

The real tangle came over the protective equipment. Some thought everyone should wear it all the time and others said it should be written out so they wouldn't have to make any decisions.

So finally the owl arose and smoothed his feathers. Everyone grew quiet, for they knew he had great wisdom. "Friends," he said, "all this is secondary. I'll tell you what we need. What we need is sincerity." And all the birds applauded and stomped and whistled.

"Yes, sir," repeated the owl, quite pleased with himself, "above everything we must be real sincere – even if we don't mean it."

And so they formed a safety program – and it was for the birds.

3d MAW Safety Review

'Repeat all after Cleared for Takeoff.'

"Cleared for takeoff. Here we go. Dum-Dum-Dee-Dum . . ."
1
"Gear up, Nose up, . . . Aileron . . . NOW!"
2
3
4
5
"Somehow this has to be the tower's fault. Let's see, they said, 'Cleared for takeoff . . .'"
6

Adapted from NATOPS SAFETY BULLETIN, 1st MAW, MCAS Iwakuni, Japan.

on . . .

an.